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ABSTRACT

The purpose of this study, concerned with the graphics arts industry, were to identify: (1) skills and technical knowledges needed by employees, (2) processes and types of equipment in use, (3) sources of labor, and (4) opinions of employers concerning personnel training. Data were obtained describing the industry in the Carolinas and Georgia by a postcard survey for general information and a long form for technical information. Fifty-nine company representatives were interviewed for opinions and desires in terms of manpower training. It was found that: (1) 52 percent of the companies employed fewer than 10 employees, (2) The greatest shortage of qualified workers was in the pressroom, followed by layout and design, composition and imposition, and reproduction photography, (3) The industry desired more post-high school formal trade training, and (4) School programs were desired in which students could obtain a broad range of experiences. Conclusions include: (1) Production employees should be prepared with a background in the overall reproductions processes, and (2) The disadvantages of production printing by school classes were numerous. (Author)

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Final Report

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GRAPHIC ARTS INDUSTRY AND TECHNOLOGY IN THE SOUTH CAROLINA LABOR MARKET REGION WITH IMPLICATIONS FOR CURRICULUM DEVELOPMENT

April 1972

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Office of Education

National Center for Educational Research and Development
(Regional Research Program)

AUTHOR'S ABSTRACT

Purpose. To identify:

1. skills and technical knowledge needed by employees
2. processes and types of equipment in use
3. sources of labor
4. opinions of employers concerning personnel training

Method of Study. Data were obtained describing the industry in the Carolinas and Georgia by a post card survey for general information, and a long form for technical information. A follow-up was used to increase response and chi square tests to check for representativeness. Fifty-nine companies representatives were interviewed for opinions and desires in terms of manpower training.

Summary.

1. Fifty-two percent of the companies employed fewer than ten employees. General commercial work was most common.
2. Offset printing was used by eighty-four percent of the companies and letterpress by sixty-two percent. Screen printing, flexography and gravure were used to a limited extent.
3. The greatest shortage of qualified workers was in the pressroom, followed by layout and design, composition-impositin and reproduction photography.
4. The industry desired more post high school formal trade training.
5. Sales and management personnel were desired with technological and business background.
6. School programs were desired in which students obtained a broad range of experiences emphasizing offset preparation and presswork backed by theory.

Conclusions

1. Production employees should be prepared with a background in the overall reproductions processes.
2. The disadvantages of production printing by school classes were numerous.

Final Report

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GRAPHIC ARTS INDUSTRY AND TECHNOLOGY IN THE SOUTH CAROLINA LABOR MARKET REGION WITH IMPLICATIONS FOR CURRICULUM DEVELOPMENT

"Graphic Arts Inventory for Education"

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U.S. DEPARTMENT OF
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Office of Education
National Center for Educational Research and Development

PREFACE

Considerable effort is being expended in the Carolinas in the area of program planning for graphic arts manpower development. The greatest extent of this is occurring in the various educational institutions. The Sourth Carolina Department of Education, Office of Vocational Education is currently sponsoring a curriculum project for vocational graphic communcations in which teachers are involved in course planning. The Printing Industry of the Carolinas Inc. has moved rapidly in the last twelve months to aid in upgrading programs through seminars and actual educator memberships. Their findings of this study will provide basic information to be used by all interested goups to assure that new programs reflect the current industrial practices, and hopefully, to assure greater success of graduates from the various training programs.

Appreciation is expressed to the PICA, Printing Industry of the Carolinas, Foundation for the extensive support afforded this study. Special thanks go to the chairman of the Education Committee, Mr. Carroll M. Spencer; PICA President George R. Morgan, and Mr. Bill Treadaway, Executive Secretary. Without their assistance, the scope of this investigation would have been greatly limited.

Sincere appreciation goes to the project staff, Shirley Gunter and David W. Dailey who worked far beyond expectations in handling the data, conducting the personal interviews and preparing the final report.

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CHAPTER I

INTRODUCTION TO THE STUDY

In 1967, there were a total of 37,989 establishments engaged in all phases of the Printing and Publishing Industry (5:28). There were almost a million workers employed in a wide variety of occupations in the field. From the year 1958 through 1968, the industry **saw** an increase in employees of from 871,000 in 1958 to 1,052,000 in 1968 (5:27). Of the total number of establishments, there were 8,035 which were employing twenty or more employees. This shows that the majority of the industry was predominately made up of small shop printers.

In 1968, the newspaper, and printing and publishing industry was the largest employer with 363,000 employees working in 8,000 plants. Commercial or job printing was second with over 240,700 employees in 17,000 establishments. More than half of these workers were in companies having fewer than one hundred employees. Those plants employing a thousand or more workers accounted for about eight percent of all commercial employers (6:499).

For the 1970's, the employment outlook is that there will be many opportunities to enter the skilled printing trades in all phases of the industry. Due to retirement and the deaths of those currently in the industry, about 8,000 openings are expected. There will be a general rise in the volume of production due to the growth of the population and the ensuing demand for increased printed matter. In the composition area, there is expected to be a decrease in employment due to the new labor saving technological changes in the typesetting and composition field. An increase is seen in the area of lithography due to its growth and expanded use (6:501).

Due to this growth of the graphic arts industry, there is a mounting shortage of qualified labor and management personnel. In order for these needs to be met by the schools, the educators must be aware of the needs and desires of the industry. Without a sound knowledge of the current problems and desires of the industry; the prevocational, vocational-technical and college level programs in graphic arts cannot effectively produce qualified graduates prepared to assume a productive role in the industry.

Sound graphic arts programs at any level must be based on technological information which can only be derived directly from the industry. At the time of this study, there was little information regarding the technology of the printing industry in the North Carolina, South Carolina, and Georgia labor market area. The needs and desires in terms of personnel preparation for the industry were also among the unknown.

The following table reveals the growth of the printing industry during the period from 1963 to 1967, (4-34:8, 4-11:10, 4-41:7).

Table 1

Department of Commerce Statistics
on the Regional Printing Industry

	1967			1963
	Number of Establishments	Total Employees x 1000	Production Employees x 1000	Total Employees x 1000
North Carolina	607	12.3	8.3	10.2
South Carolina	232	3.9	2.4	3.6
Georgia	599	12.9	8.6	10.2

The above statistics reveal a growing industry in the Carolinas and Georgia. To accompany this growth there had been a corresponding increase in the number of schools with graphic arts programs. North Carolina had forty-one vocational graphic arts programs at the high school level; South Carolina had fourteen, and Georgia had seven. The growth of the school offerings had, to a certain extent, paralleled that of the industry when numbers of programs were considered. However, during that period there had been no parallel assessment of the technological growth in terms of the demands placed on manpower.

Statement of the Problem

The problem upon which this study focussed, arose out of the recent institution of educational programs in an industrial area of an undetermined nature. Based upon the premise that a graphic communications course is one of a technical nature having as its content the activities and technologies of an industry, a study of that industry was needed in order to provide a sound basis for curriculum development. For the purpose of this study, the terms graphic communications and graphic arts are synonymous.

Purpose of the Study

The purpose of the study was to either adjust or support the objectives and purposes of the graphic arts programs in the schools at all levels. The information gathered was necessary in order that the students in the above programs would not be studying and perpetuating areas, techniques and practices which were obsolete or seldom used by the modern graphic arts industries.

The study attempted to provide answers to the following questions:

1. What technical knowledge is needed by employees in production positions in the graphic arts?
2. What technical knowledge is needed by employees in sales and management positions in the graphic arts?
3. What skills and knowledge are desired of production personnel in the graphic arts?
4. What types of equipment are used now, and what types can we expect to see added in the immediate future?
5. What skills and knowledge are desired of sales and management personnel?
6. What production processes are presently utilized in graphic arts plants of given sizes?
7. What are the sources, qualifications, and backgrounds of labor in graphic arts?
8. What is the geographical distribution of graphic arts industries in the labor market area in terms of types and sizes of operations?
9. What are the public relations practices and who performs this function in plants of given sizes?
10. What are the opinions of employers as to the desirability of educational or formal training programs at the (1) nondegree post high school, (2) technical school, (3) high school vocational, and (4) college levels?

Significance of the Study

The significance of the study was to provide the following implications for education. Provide a basis for:

1. estimating the number and location of prevocational, vocational, technical, and college level programs as indicated by the number and size of the graphic arts industries in the North Carolina, South Carolina, and Georgia labor market areas.
2. providing a guide to be utilized in graphic arts education indicating types of equipment in various areas of the graphic arts industries.
3. either adjusting or supporting the objectives and purposes of the graphic arts education programs recently established in the

region.

4. providing a series of conclusions in written form that will be disseminated to all educators, administrators in the State Department of Labor and Education, and industries interested in graphic arts, as well as leaders on the national level.

5. providing data which will aid in properly directing the educational programs at the college level which will prepare future teachers and industrial leaders.

Limitations of the Study

Any study of this type is limited by the degree of success in developing a complete and accurate mailing list. This study was no exception.

Another limitation to the study was revealed by an examination of the information forms returned by the industry. In certain cases, both the post card survey and the long form were only partially completed.

The post card survey was mailed first to obtain basic data describing the industry. The long form was mailed only to respondents of the post card survey and was the primary data gethering instrument. See Appendix A for the post card survey and the long form.

Further examination indicated that those areas of minimum importance to a given respondent were the areas omitted.

The design of the post card survey and the long form was intended to be universal to all printers, although it was realized by the researchers that certain responses would not apply to all printers. Many of the small printers indicated that the form was too complex for their size operation and that many of the questions were not applicable, and therefore did not answer all questions. There was also some evidence to indicate that certain terms were not understood universally. For example, screen printing is the name of a major printing process. It appeared that some respondents had treated this as if it meant halftone printing. In areas where this was prevalent, the text of the report made this clear.

Review of the Literature

It was found by a review of the recent literature, that there have been only a limited number of studies concerned with the needs of the graphic arts industry and education. This review of the literature was mainly concerned with that research into such areas as the relationship of the graphic arts industry with educational institutions, and programs that were in existence for training teacher educators, and employees for the industry.

Traditionally there has been a lack of adequately trained personnel entering the industry and with the rise in the labor force in the graphic arts industry, this shortage is expected to continue, according to Rayford. Educators and printers have long differed in their thinking as to the value of vocational education for the printing trades. He undertook a study in 1967 to ascertain whether or not there were differences between the needs of the printing industries and the training supplied by the vocational printing programs in the state of Missouri (8:7). Cox made a study similar to Rayford's in 1970 in which he surveyed the printing industry in the states of Arkansas, Oklahoma, Kansas, Missouri, Illinois, Kentucky and Tennessee (2:1113-A). Previous to either Rayford or Cox, Strandberg conducted research in 1963 in order to ascertain the following (11:4).

1. What current practices were required of the worker by the printing industry.
2. The attitude of industry toward the teaching methods employed in teaching vocational printing.
3. What equipment was used in the printing industry.
4. How these findings compared with similar factors in secondary schools offering vocational printing instruction.

In 1969, Robertson conducted a survey of the printing industry in the state of Utah to provide factual documentation and recommendation for or against providing state support for the establishment of additional graphic arts programs in schools under the jurisdiction of the State of Superintendent of Public Instruction (10:3). This study developed out of the needs of the industry for more qualified personnel and the schools for additional facilities and equipment which, due to the high cost involved, must be carefully justified before purchase. He concluded that there was a reasonable basis for the establishment of a secondary vocational technical program in Utah schools, due to the fact that the number of graduated trainees amounted to about one half of the expected job openings. He also found that the industry was not well enough aware of the extent or content of the programs offered in the schools and suggested that closer relations be developed between the industry and the schools (10:17).

This closer relationship between the industry and the schools was also recommended by both Rayford and Strandberg (8:189; 11:116). Both of these studies found that the needs of the industry were not being met by the existing programs in graphic arts. Less than half of the managers of the printing companies surveyed reported that the schools were doing an adequate job in regard to training in levels of skill, while twenty-three percent indicated the schools were doing an inadequate job in skill level training (8:185).

Rayford found that ninety-five percent of the 126 graduates of the existing graphic arts programs had secured employment in printing or related trades within two weeks after completion of their training (8:188). From one to five years later, sixty-three, or fifty percent, were working in the printing trades or a related trade (8: 187). Management reported that most of them were performing at a satisfactory or superior level, and that they had started at a wage higher than that of graduates who had taken jobs in work unrelated to their training.

In the area of the use of equipment, Strandberg stated that the industry reported the use of offset composition, camera work and platemaking, and offset press work exceeded the extent to which these areas were emphasized in the schools. The schools were doing more imposition, lockup, and letterpress presswork than the industry. Rayford substantiated this finding. More training is needed in halftone and color work, tape-punching, layout and design, and in operation of offset presses rather than office size duplicators. Cox indicated that managerial functions received little emphasis and recommended increased training in this area. He also found that the industry gave more emphasis to personal characteristics than to any other area (2:113-A).

Cox also recommended the increased use of field trips, resource persons, wall charts, industrial publications, movies and/or slide presentations to communicate practices which could not be adequately covered in the classroom due to the limitations of space and equipment. Rayford recommended that the instructors of graphic arts should keep abreast of new techniques through training or learning experiences. Also closer cooperation between the schools and industry would allow extension courses to be developed with qualified craftsman as instructors. A need has also been shown to bring the student into an increased awareness of the graphic arts earlier in the school career, with an increased emphasis on the guidance function.

In a study completed at the University of Northern Colorado in 1970, Ronald Glogovsky attempted to determine the extent to which industrial arts teacher education institutions were including present processes in graphic arts curriculums for future industrial arts teachers. In addition, he was concerned with the procedures used by graphic arts teachers for keeping abreast of the industry and the methods most frequently used by industrial arts teacher educators to introduce new media concerning printing equipment, materials, and processes (7:6).

No teacher preparation institution offered all processes extensively used by the industry and many processes were only limited in the extent of instruction offered. On the whole, institutions are not changing to reflect modern industrial graphic arts innovations. Teacher educators were for the most part using inadequate procedures to obtain insight into modern industrial practices. Over half of the respondents indicated that the instructor was personally responsible for learning of new media concerning materials, tools, and processes.

In a study in which graphic arts teachers were surveyed in the state of Maryland in 1969, Wilson found the curriculums at the secondary school level to be greatly lacking. Curriculum guides at the state level were not available and county curriculum guides were not available to all teachers. Facilities were inadequate and almost half of the students taking graphic arts were without textbooks. Approximately half of the teachers had plans for further training or education, while the majority had been teaching graphic arts for five years or less. Over half of the teachers had been employed in the industry (3:1156-A).

Wilson recommended that graphic arts be made available to all students, especially at the junior high level and that the number of courses be increased to meet student interests. Also more adequate facilities should be provided, along with the development of curriculum guides and the availability of texts to all students. In addition, he recommended that teachers should be encouraged to continue their training at all levels (3:1156-A).

Claude Rieth concerned himself with a study to determine the printing production skills and knowledge considered important by the printing industry for supervisory and management positions. The study was an attempt to identify trade and managerial competencies needed by college level students entering these positions in the printing industries in Indiana (9:1).

The purpose of listing trade and management competencies was to formulate a list of craft and technical traits or abilities in printing mechanics and management in order that managers of Indiana printing could indicate trends in the industry. From these trends college-level printing management curriculums could be devloped. The competencies studies cover the mechanics of the industry in areas such as layout, composition, presswork, and others. The management and office competencies covered personnel policies, planning, coordinating and scheduling (9:29).

Rieth concluded that a difference of opinion existed between the printers of Inidana and a jury of leading printers throughout the country as to the importance of trade training in college-level management programs. Such skills as communications, personnel administration, costing, planning, marketing, and standards were considered important. A knowledge of the principles and application of electronic devices, paper, major printing methods, and trade terminology were also shown to be important. Press operation is not as important as the production potential, quality standards, and maintenance of production machines (9:100).

In summary, it can be said of the majority of the research that has been conducted, that there is a need for further expansion of the existing graphic arts programs at all levels of education. It has also been shown that there is an increasing need for closer cooperation between the industry and educators. In order that graphic arts programs be maintained at a level appropriate for the preparation of qualified graduates for the industry. One reason for the lack of qualified personnel coming out of the programs was that many of the practices taught were becoming increasingly outmoded.

CHAPTER II

SOURCES OF DATA AND METHOD OF STUDY

Printers of all sizes and types of operations were surveyed in the three state region of North Carolina, South Carolina, and Georgia. The mailing list to cover these companies was made up with the assistance of the Printing Industry of the Carolinas (PICA). Mailing lists of trade periodicals and membership lists of the Priniting Industry of the Carolinas and Georgia were used to make up the master mailing list. In addition, several companies were added to the list which were known to the project director.

There were a total of 1989 entries on the mailing list as originally compiled. Of these, 1174 were in North Carolina, 452 in South Carolina, and 363 were in Georgia. Prior to the first mailing, ten entries were withdrawn as being obvious duplications or schools. Schools were withdrawn since the study was directed at the industry and not concerned with student production work. As will be shown, these were not the only entries that were removed from the mailing list. After these withdrawals, there were a total of 1979 entries that were included in the initial mailing of the post card survey.

The project proposal called for two main instruments to be used to study the industry in the labor market region of North Carolina, South Carolina, and Georgia. There was to be a short post card survey to be followed by a long form that would seek to describe the technical activities and manpower needs of the companies studied. Both are shown in Appendix A.

The first survey instrument sent out was the post card which was mailed to the 1979 companies on the mailing list as compiled. Revisions were made in the post card to give additional information not included on the proposed form of the post card survey. A cover letter that was sent along with the post card survey explained the study. See Appendix A for this letter. The purpose of the post card survey was to reveal the processes used by particular companies and the nature of the printing being done. The approximate number of employees was also requested for the purpose of comparing companies on the basis of size.

The post card survey would accomplish two of the objectives of the study:

1. What production processes are presently utilized in graphic arts plants of given sizes?

2. What is the geographic distribution of graphic arts industries in the labor market area in terms of types and size of operations?

The long form was reviewed and found to need revision from the original proposed form. Revisions were made to put the form into a more logical order and to create a more legible, easy to complete form. Before the form was printed and considered ready for distribution to the industry, it was reviewed by prominent individuals in several of the companies which were to be surveyed. Their suggestions were considered and incorporated into the form where appropriate.

The long form would accomplish five of the proposed objectives of the study.

1. What technical knowledge is needed by employees in sales and management positions in the graphic arts?
2. What are the sources, qualifications, and backgrounds of labor in graphic arts?
3. What skills and knowledge are desired of sales and management personnel?
4. What are the public relations practices, and who performs this function in plants of given sizes?

In order to accomplish the remaining objectives of the study, an interview schedule was devloped to be used in a personal interview with the president, production managers or other knowledgable individuals in the major and selected companies in the three state labor market area.

The following objectives would be accomplished by the personal interviews:

1. What skills and knowledge are desired of production personnel in the graphic arts?
2. What technical knowledge is needed by employees in production positions in the graphic arts?
3. What types of equipment are used now, and what types can we expect to see added in the immediate future?
4. What are the sources, qualifications, and background of labor in graphic arts?

The interview was concerned mainly with the sources of labor in question four above, since the long form gathered the additional information asked in the question.

In order to obtain a pleasing appearance and to give the entire study a sense of unity, the project was entitled "Graphic Arts Inventory for Education." This title appeared on all instruments and stationery used in the study along with a logo of the three states to be studied within an outline map of the United States. This title and logo did not appear on the post card survey due to space and postal regulations.

The slogan, "Help develop better education for better manpower!", was also adopted to appear on all stationery. The title, logo and slogan were designed to present a quality study to the printing industry in in order to achieve an increased percentage of returns. Matching blue stationery and ink were chosen for the same reasons. The stationery used is in Appendix A.

Procedure of the Study

The post card survey was the first data gathering instrument to be mailed, along with a cover letter explaining the study as shown in Appendix A. On October 4, 1971, 1979 post cards with cover letters were sent to the three state labor market region. In order to encourage a greater response to the post card survey, a follow-up letter was sent out twenty days later on October 25, 1971. This letter was cosigned by Mr. George Morgan, President of PICA and Mr. Carroll Spencer, President of the PICA foundation. (Appendix A) This letter was sent to all companies that had failed to respond to the post card survey by this date.

The long form was mailed to all respondents to the post card survey. A cover letter was enclosed explaining the form and the urgency of returning the completed form. (Appendix A) The form and cover letter, along with a prepaid business reply envelope, were mailed on October 27, 1971, three weeks after the initial mailing of the post card survey.

Ten days after the form was sent out, the first follow-up letter was mailed on November 6, 1971 to all companies that had not returned the form. This letter expressed the need for the information that would be provided by the completed form. (Appendix A)

Due to the late returns of the post card survey, subsequent mailings of the form, first, and second follow-up letters were made over a two month period. The intervals of one and two weeks between letters were maintained as per the first sequence of mailings.

Six weeks after the initial post card mailing, during the week of November 15-19, 1971, a ten percent sample of all non respondents was drawn with the aid of a table of random numbers (11:158-161). One hundred and five companies were selected and contacted by telephone in order to procure the information called for on the post card survey. Of the one hundred and five calls made, it was found that forty-one of the companies were either out of business, did not print, or were unlisted. A total of sixty-four companies were contacted that were engaged in printing and the post card data were completed for them. It was found that the person listed on the original mailing list was no longer with the company in thirteen out of the sixty-four companies that were contacted.

The purpose of the telephone follow-up was to check the degree to which the post card respondents were representative of the industry as a whole. This was done by determining whether or not there was a significant difference between those companies that returned the post card survey and those that did not. A chi square test was used to test the significance of differences using twelve items from the post card survey.

The following items were compared:

- Newspaper, daily
- Newspaper, weekly
- General commercial
- In-plant printers
- Book publications
- Business forms
- Offset printing
- Letterpress printing
- Screen printing
- Hot type composition
- Cold type composition
- Binding

Response of the 801 companies who voluntarily returned the post cards were compared with those of the sixty-four companies contacted in the telephone follow-up.

The value of chi square was computed, based on the differences between the observed and expected frequencies using the following formula. The computations are shown in Appendix B.

$$x^2 = \sum \left[\frac{(\text{observed-expected})^2}{\text{expected}} \right]$$

The chi square value computed was $x^2 = 14.46$. At the .05 level of significance, with the twelve degrees of freedom, a chi square value of $x^2 = 21.03$ would be required for a significant difference (1:126). Since the chi square value observed was well below that figure, it was concluded that there were no significant differences between those companies that returned the post card survey and the random sample of non-respondents. Therefore, if the theory of randomness is valued, this would further tend to indicate that there were no significant differences between the companies that returned the post card survey and those that did not.

Forms were then sent to these companies. Only thirteen of these sixty-four companies returned the form which was mailed on November 20, 1971.

Two months after the initial mailing of the post card survey, personal interviews of selected companies were begun. These interviews were made over a three month period extending from December, 1971 through February, 1972. The project director, Dr. J. Page Crouch; Miss Shirley Gunter, and David W. Dailey, the PICA research coordinator, were involved in making these interviews over the three state region.

Also during the time the personal interviews were being made, five percent of the nonrespondents to the long form were surveyed in person by the researchers for the purpose of ascertaining the extent to which they may have differed from the respondents. This random survey was limited to certain geographical areas due to the expenses involved in long distance travel. See Appendix B for map of areas covered by follow up study.

This interview of five percent of the companies that did not return the long from provided another comparison as to the representativeness of the industries with those companies that returned the long form. Of the twenty-three companies selected with the aid of a table of random numbers, only sixteen forms could be collected (11: 158-161). The remaining seven companies were either uncooperative or were unwilling to take the time to complete the form.

The data from the personal interview follow-up were treated separately from all other data and then compared to the data for those companies which returned the long form by mail. Again, as with the data from the telephone survey, a chi square test was used to compare the responses. The data used for comparison was selected from items on the long form which had a high level of response. Items were taken from the major areas of the form as follows: one item each from layout, composition and photographic departments; two items each from printing plates and presswork; and seven from personnel preparation. Three items were based on companies doing over seventy-five percent by a single process. A total of seventeen items were chosen for comparison.

There were 494 companies that returned the long form and sixteen companies which completed a long form during a personal interview. The chi square test gave a value of $x^2 = 8.10$. At the .05 level of significance, with seventeen degrees of freedom, the upper limit was a chi square value of $x^2 = 27.59$ (1:26).

Since the chi square value obtained for the comparison was less than the value required for significance, it was concluded that there was no significant difference between the two groups. This would further indicate that there was no significant difference between those companies that returned the long form and those that did not. The data were then combined with data from all other respondents along with the data from the telephone follow-up. Data were then treated statistically for the purpose of making comparisons on the basis of size of company and processes.

Of the original mailing list of 1979 companies that were mailed the post card survey, it was found that two hundred and four companies fell into one of the following categories: out of business, did not print, insufficient address, or unlisted. This narrowed the total population studied to 1775 companies in the three state labor market area.

There were a total of 882 post cards returned, or 46.69 percent of all companies studied. Of the companies returning the post card survey, 517 were in North Carolina, 185 in South Carolina, and 180 were in Georgia. These companies were mailed the long form and of these, 501 or 56.88 percent returned the long form. Of the 501 forms, seven were unusable. There were thirteen forms returned as a result of the telephone survey. This gave a total of 507, or 57.48 percent of the 882 companies that had returned the post card survey. Of the twenty-three companies that were in the five percent follow-up by personal interview, sixteen forms were gathered. The remaining seven companies were either uncooperative or would not take the time to complete the form. This gave a total of 523, or 59.30 percent of the 882 companies that returned the long form, upon which the data reported in the study were based. The data from the 359 companies which only returned the post card survey were used to the extent possible.

CHAPTER III

DESCRIPTION OF THE INDUSTRY

Data presented in this report were obtained by means of three primary survey methods: (1) a mailed post card containing descriptive categorical items; (2) a five page information form gaining more detailed information describing technical procedures in use, employee training backgrounds and needs of employers; and (3) a weries of fifty-one interviews of selected industry executives, or their delegates, in which opinions regarding such things as needed skills and knowledge as well as current manpower related problems were identified.

The purpose of this chapter is to describe the current industry in North Carolina, South Carolina, and Georgia in terms of size, distribution and nature of work being done. It further describes the specific practices in use by companies in the major departments. For the purpose of this study these departments were layout and design, composition and imposition, presswork, and bindery and finishing.

The nature of the industry cannot be understood without breaking it down into companies of various sizes. Table 2 presents the numbers of companies in each of five categories based on total numbers of employees.

Table 2

Description of Company Size
by Number of Employees

	Company Size					
	1 - 4	5 - 9	10 - 19	20 - 49	50+	Total
Number of Companies	240	211	153	133	124	861
Percentage	27.87	24.51	17.77	15.45	14.40	100.00

The reason this breakdown does not total 882 is that some respondents were unable to divulge the number of their employees. It will be seen by examination of table 2 that the majority of the companies which make up the graphic arts industry in the Carolinas and Georgia are small in size with 70.15 percent employing fewer than twenty people. The trend toward larger companies was evident when these figures were compared to those in chapter one from the 1967 Department of Commerce report. The figures reported there revealed that approximately eighty percent of the industry had fewer than twenty workers. The average number of employees for all the companies responding was 42.65. The median number of employees was 8.5, however, and the most frequent company size was three, of which there were eighty-two.

Table 3 provides a further breakdown of companies revealing the average size shop within each category as well as an indication of the growth for the year 1971.

Table 3

Average Number of Employees and Growth for Companies of Different Sizes

Description of Variable	Company Size					
	1 - 4	5 - 9	10-19	20-49	50+	All Companies
Average number of employees	2.73	6.63	13.34	29.27	231.70*	42.65
Average number of production employees	1.34	4.17	9.45	22.59	203.28	35.85
Average number of new production employees in 1971	.32	.95	1.43	2.91	9.86	2.45
Percentage gain in production employees in 1971	23.88	22.78	15.13	12.88	4.85	6.83

*This statistic was strongly influenced by a few very large companies. The median number of employees in this category was 105.

The growth of an average of 2.45 employees per company should be considered carefully since over seventy percent of the companies had fewer than twenty people, and the year 1971 was known as a relatively very slow business year.

Nature of Work Being Done

Of the 882 companies returning the post card survey, see Appendix A for copy of the post card survey, the largest classification of work was reported to be general commercial. Table 4 presents a detailed breakdown of the types of work done by the 882 respondents to the post card survey.

Since many companies do work in two or more categories, these numbers will not total 882.

Table 4

Description of the Industry by Production Categories

Production Categories	Number of Companies	Percent
General commercial	580	65.76
Business forms	213	24.15
Fast print	117	13.27
In-plant	115	13.04
Weekly newspaper	113	12.81
Books	94	10.66
Trade shop	91	10.32
Other	68	7.71
Other newspapers	49	5.56
Package print	46	5.22
Greeting cards	42	4.76
Daily newspaper	41	4.65

The second most common type of work was the printing of business forms which was reported as being done by 24.15 percent of all the respondents. It must be recognized that each respondent could check as many of the work classifications as fit his business, and most checked several of the categories. This factor is important in that it shows the widely varied nature of work done by the majority of printers.

A much more descriptive picture of the industry is presented in table 5 which shows the nature of work done by companies in the five size categories. Of particular significance is the breakdown of work done by large shops of fifty or more employees. In this group, far fewer did general commercial work than the other shop sizes. These large companies included the great majority of daily newspapers, and nearly half of all the printers doing package printing.

Table 5

Description of the Production Work Categories
Compared to Company Size

	Company Size				
Production Categories	1 - 4	5 - 9	10 - 19	20 - 49	50+
General commercial	*72.50	74.41	71.90	60.90	37.90
Business forms	26.67	25.60	24.84	21.80	18.55
Fast print	16.67	17.06	13.07	7.52	6.45
In-plant	11.25	15.17	13.73	8.27	16.13
Weekly newspaper	8.75	9.95	30.07	15.04	3.23
Books	6.67	9.96	13.73	17.29	9.68
Trade shops	13.75	9.48	8.50	14.29	4.03
Other	2.92	6.16	5.88	10.53	16.13
Other news	3.75	1.90	7.84	14.29	2.42
Package print	1.25	2.84	5.23	6.77	15.32
Greeting cards	8.75	4.27	3.92	....	3.23
Daily nespaper	....	.47	1.96	5.26	24.19

*Percent of all respondents in the company size category.

Another point which stands out in describing the work of shops in size categories, is the large number of those employing ten to nineteen people which were engaged in printing weekly newspapers. Forty-six out of 113, or 40.71 percent of the companies doing weekly papers were in this size category. Also worthy of attention was the extent to which shops of fewer employees were engaged in fast print services, in-plant printing and services to the trade, selling intermediate products to other graphic arts concerns for use in further processing.

Major Processes Used by Graphic Arts Industries

Of major concern to planners of educational programs is the extent to which various industrial reproduction processes are in use. Table 6 gives a comparison of the companies by size with the processes in use.

Table 6

Use of Major Processes by Companies of Different Sizes

	Company Size					
Major Processes	1 - 4	5 - 9	10 - 19	20 - 49	50+	All Companies
Offset	*82.08	91.00	87.58	84.21	75.80	84.35
Letterpress	60.42	55.92	65.36	61.65	69.35	61.91
Screen printing	3.33	4.27	5.23	6.02	12.90	5.56
Flexography	.42	2.37	1.96	2.26	5.65	2.27
Gravure	....	.47	....	....	5.65	1.02

*Percent of all respondents in the company size category.

Upon examination of table 6, it is immediately evident that offset was the leading process in use in the three state region regardless of company size category. Letterpress, the former leader, was still quite clearly an essential process to the graphic arts industry as indicated by the fact that 61.91 percent of all respondents used this process to some extent. Only fifty-two or 10.48 percent of the respondents to the long form reported that letterpress accounted for seventy-five percent or more of their work while 269, or 54.23 percent reported that offset made up over seventy-five percent of their production. This factor, along with the interview phase of the study indicated that schools should avoid placing excessive emphasis on letterpress skills. According to the interviews, this phase of the industry was found to be declining relative to the other processes. It was nearly unanimously agreed, however, that the student desiring to enter a graphic communications career should be familiar with the letterpress process to the extent of having some hands-on experience.

Further corroboration for such recommendations may be seen in table 7, which presents a breakdown describing the extent of use of each process in more detail.

Table 7

Extent to Which Work Was Done
by the Five Major Processes

Process	None	1 - 25 Percent	26 - 50 Percent	51 - 75 Percent	76 - 100 Percent
		Volume of Work by Percentage			
Letterpress	*32.46	31.45	18.75	6.85	10.48
Offset	10.08	6.85	12.90	15.93	**54.23
Screen printing	93.75	4.44	1.20	.....	1.61
Flexography	95.97	2.22	2.40	.20	1.21
Gravure	97.98	1.61	.20	.....	.20

*Percent of all respondents to the long form. N= 496
**25.81 percent printed by offset 100% of the time.

It can be seen that over half of all the companies responding to the long form were producing more than seventy-five percent of their work by the offset process, as compared to only 10.48 percent for letterpress. More than twenty-five percent printed exclusively by offset.

Of particular interest was the finding from the post card survey that over five percent of all companies did some screen printing and that the extent to which this was reported increased with the size of the company.

Flexography was found to be in use to some extent by companies of all sizes, while gravure was only used by the large companies. Both these processes were used extensively in general commercial, and package printing with flexography also used by in-plant printers.

In further analyzing the nature of the industry, the study obtained data indicating the extent to which companies engaged in more than one printing process. Table 8 reveals this data.

Table 8

Extent of Production in
More Than One Process

Number of Processes	Number of Plants	Percent of All Companies
0	52	5.90
1	333	37.76
2	460	52.15
3	33	3.74
4	4	.45
Total	882	100

It was immediately evident upon examining the data that the graphic communications industry is varied in its practices, with over fifty-six percent printing by two or more processes. The reader should not be dismayed by the finding that 5.90 percent do not employ any of the five major processes. These make up the specialty shops serving the trade; the most common of which are typography shops, and photoengravers who sell negatives, plates and other services exclusive of printed products.

Other General Information

In addition to a breakdown of companies into size categories, data were obtained to describe the change of employees in companies in terms of the number of new production employees. The new employees would be explained either by growth of the company or turnover. These statistics were obtained by subtracting the sales and administrative personnel from the total number of employees to yield an estimate of production workers, and dividing this subtotal into the number of new production employees hired since January 1, 1971. This procedure yielded an indication of 5.74 percent of change in work force. This statistic is of value in providing an indication of the magnitude of training having to be done by the companies. The interview portion revealed clearly that new employees were hired mainly without any formal training. No data were obtained on turnover rates specifically.

CHAPTER IV

TECHNICAL PRACTICES BY DEPARTMENTS

The following portions of the report present the data describing practices and equipment in use in the major departments at the time of the study. The quantitative data presented came from the long form, which was completed by 523 companies, or 59.30 percent of the total number who returned the initial post card survey.

Layout and Design

Table 9 - 12 reveal the data describing the activities of graphic arts industries in the area of layout and design. Table 9 reveals the responses when printers were asked to indicate the extent to which layout and design was done by outside agencies.

Table 9

Extent to Which Layout and Design Was Done by Outside Agencies

Number of Employees	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
1 - 4	*46.32	38.95	5.26	6.31	3.16	95
5 - 9	23.66	53.76	5.38	7.52	9.68	93
10 - 19	19.05	55.95	13.10	7.14	4.76	84
20 - 49	18.67	57.33	12.00	6.67	5.33	75
50 +	16.25	60.00	11.25	5.00	7.50	76
All Companies	26.50	52.07	8.99	6.45	5.99	448

*Percent of companies responding in this category.

Approximately twenty-six percent reported that this was never the case, while 52.70 percent indicated that less than twenty percent of the work was done outside. Forty-six percent of the companies of four or fewer employees reported that no layout and design was done outside. This figure decreased with increases in company size to 16.25 percent for the companies with over fifty employees. These data clearly show that smaller companies tend to do more of the actual layout and design work prior to production in their plants. Nearly eighty-four percent of the largest companies report having some of their work done outside, although sixty percent indicate that this involves less than twenty percent of their work. Only 12.44 percent of all respondents had over fifty percent of this work done outside.

When asked the extent to which the company staff did the layout and design work, only 15.28 percent indicated that no work of this type was done. The extent to which this was being done was distributed almost evenly from less than twenty percent to more than eighty percent as indicated in table 10.

Table 10

Extent to Which Layout and Design Was Done by Company Staff

Number of Employees	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
1 - 4	*21.43	22.45	16.32	17.35	22.45	98
5 - 9	16.16	25.25	20.21	16.16	22.22	99
10 - 19	11.49	19.54	18.39	25.29	25.29	87
20 - 49	12.50	18.75	26.25	22.50	20.00	80
50 +	10.35	19.54	18.38	24.14	27.59	87
All Companies	15.28	21.40	19.44	20.74	23.14	458

*Percent of companies responding in this category.

Table 11 reveals the extent to which complete layouts are furnished by the customers. Only 15.30 percent of all respondents reported that this was never done. Customer furnished layouts are, however, only used in twenty percent or fewer cases by over half of the respondents, thus indicating that although a common practice, customer furnished layouts do not make up the primary source of layouts for the printer. When the extent of the use of customer furnished layouts was examined on the basis of company size, there was no relationship seen, thus indicating that use of such customer furnished layouts was similar for companies of all sizes.

Table 11

Extent to Which Customers
Furnish Complete Layouts

Number of Employees	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
1 - 4	*17.78	52.22	18.88	5.56	5.56	90
5 - 9	17.53	48.45	15.46	12.37	6.19	97
10 - 19	9.41	68.24	10.58	4.71	7.06	85
20 - 49	12.35	58.03	12.34	4.93	12.35	81
50 +	13.92	51.90	22.79	5.06	6.33	79
All Companies	15.30	54.80	15.75	6.85	7.30	438

*Percent of companies responding in this category.

Data were also obtained to describe the sources of camera ready copy. Table 12 reveals the extent to which camera ready copy is provided by the company staff, outside agencies and the customer. An examination of the data reveals that 88.30 percent of the companies prepare camera ready copy in the plant while only 11.70 percent do no work of this type.

Table 12

Extent to Which Camera Ready Copy
Was Provided by Selected Sources

Sources	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
Company Staff	11.70	17.22	18.10	24.06	28.92	453
Outside agencies	24.35	56.02	10.41	5.44	3.78	423
Customers	15.01	56.42	17.91	6.30	4.36	413

Over half of all camera ready copy was prepared by the company staff according to 52.98 percent of the respondents. No appreciable differences existed when the data were broken down into company size categories with one exception. Nearly seventeen percent of the compnies with one to four employees did no preparation of camera copy. Approximately sixty percent of the companies doing over seventy-five percent of their printing by the offset process reported that over half of the copy was prepared by company staff, whereas, printers doing over seventy-five percent by letterpress prepared less than thirty-five percent.

When asked to indicate the extent to which camera ready copy was provided by outside agencies, only 3.78 percent indicated that over eighty percent was in this category, while 24.35 percent reported obtaining no camera copy from outside agencies. There was no relation apparent between size of company and extent to which copy was provided by outside agencies. Companies printing over seventy-five percent by the letterpress process used camera copy from outside sources less than others, with 39.02 percent using none as compared to 24.35 percent for all respondents.

Another source of camera ready copy was the customer. Approximately eighty-five percent of the respondents reported some use of customer camera ready copy, although 56.42 percent indicated that this amounted to less than twenty percent of the time. Only 10.66 percent reported that over half of the camera ready copy was customer provided.

Layout and Copy Preparation Interview Responses

In the interview phase of the study, company representatives were asked several questions regarding each of the major departments covered on the long information form. Such things as technical knowledge required of employees, desirable educational experiences of applicants, major problems encountered, new developments, and history of employee supply source were included in the information requested. The questions asked of the representatives, along with the names of the representatives by states are shown in Appendix C.

Technical Knowledge Needed. When asked the question, "What technical knowledge is needed by people in this area?", the most frequent response was a general understanding of the flow of a job through production. It was considered essential that employees planning the job know the requirements of the various departments in order to avoid creating problems later in the production of a job. A general knowledge of reproduction photography and typography were also considered very important by those interviewed. The item mentioned with the next greatest frequency was a need for a basic background in mechanical drawing. This was not meant as a need for specialty courses in drawing, but rather a need to be able to measure accurately; draw lines that are straight, parallel, and perpendicular and at the proper distance from one another; and be able to work with extreme accuracy and particularly neatness. Mentioned with almost the same frequency was the need for people planning and preparing copy to be able to use arithmetic along with measuring to mark layouts correctly. If the trainee cannot add, subtract, multiply and divide, he will be at a disadvantage in scaling photography, copy fitting, or planning paper needs. The following list reveals the many things which respondents considered important. The list is organized in order of decreasing importance based on the frequency with which the item was mentioned.

Technical Knowledge Needed by Personnel in Layout and Copy Preparation

Frequency	Technical Knowledge
17	Understand flow of work through entire process
13	Reproduction of photography
11	Typography
10	Mechanical drawing
9	Good design principles
9	Math and measuring
7	Layout techniques
7	Cut masks and overlays
7	Scaling and cropping photos
6	Realize function of finished piece
6	Know press limitations
5	Copy fitting and mark up
4	Art background
4	Color theory
4	Know paper weights, sizes, and grains
3	Pasteups
3	Bindery
2	Knowledge of equipment (display typesetters, composers)
1	Advertising experience
1	Spelling
1	Ruling, pen work
1	Creepage on over 32 page signatures
1	Air brush

The list shown above indicates the breadth of knowledge needed by people in the planning and preparation phase of the graphic arts industry. Respondents almost unanimously agreed that this was one of their most significant areas of need. In the long mailed out information form, when asked to rank the first three departments in terms of greatest shortage, the layout and design department was ranked first by 139 or 33.33 percent of the respondents; second by ninety-eight or 23.50 percent; and third by forty-eight or 11.51 percent. As a department, this was second only to the pressroom as being in critical need of employees.

Major Problems Encountered in Layout and Design. In order to plan future educational programs for people desiring careers in graphic arts, it was considered important to know the current problems of workers in given areas. In this way programs in the future might better train people who are not characterized by the same old weaknesses.

When asked to identify the major problems encountered related to work done in layout and copy preparation, the following responses were given.

The list below presents the responses in decreasing order based on the number of times they were mentioned in the interviews.

Major Problems in Layout and Copy Preparation

Frequency	Major Problems
12	Does not realize relation of his work to others
9	Crooked lines, squareness problems, spacing
9	Communication of problems
7	Inaccurate planning of work
6	Inability to follow instructions
6	Too slow
5	Bad proofs
4	Inability to prepare camera copy
3	Copy fitting and marking
3	Lack of creativity
2	Disciplines problem
2	Wrong size for press
2	Poor taste
1	Incorrect scaling and dropping
1	Cannot do combination pasteup

It becomes readily apparent that the people are not knowledgeable about the overall graphic reproduction processes. The problem identified most often was the failure of people preparing originals to see the relationship between their work and that of people in other production areas. This supports the need expressed in the area of technical knowledge for people who are knowledgeable about the work done in all areas. It is apparent that in too many cases employees actually create situations which cost time and money in subsequent departments.

The problem expressed with the second greatest frequency was the lack of attention to details in proper alignment and spacing. This problem was reflected in the desire for people with some drafting background which had proven to be a good base for employees in copy preparation. Inaccurate planning was mentioned next, followed by two closely related problems, namely communication problems and inability to follow instructions. These two have strong implications for education as a whole, as well as graphic communications. Working too slow was mentioned next, a problem frequently reported in the context of cost estimates. Employers found that too frequently the worker spent a great deal of time on a job for which copy preparation was priced low compared to spending the same time on jobs where this operation had been allowed considerably more time. This situation might be tied back to the problem of a lack of communications in some cases.

Basic Experiences Recommended for Graduates of Training Programs. Company representatives were next asked to list basic experiences which they would want new employees to have if they had taken courses in graphic communications.

A list of responses is provided below in the order in which they were most frequently mentioned.

Basic Experiences Desired

Frequency	Basic Experiences
22	Prepare layouts
17	Know entire job process and industry
15	Clean, straight pasteups
15	Drafting, measuring
13	Design sense, balance, creativity, harmony
8	Page layout
7	Typography
5	Follow directions
5	Limits of press
4	Copy fitting and marking
4	Clip out and transfer type, Leroy lettering
3	Scaling and cropping
2	Visualize finished job
2	Prepare dummies
2	Windows for halftones
1	Repro proof
1	Photography
1	Scribing and opaquing
1	Cut flats
1	Advertising experience and marketing

Among the experiences recommended most often were preparation of overlays, production of clean and accurate pasteups, basic drafting procedures, and practical work with design development to bring about a working sense of balance and creativity. Here again, the need was stressed for an overall understanding of the job and the processes used in its reproduction. It was also recommended that students gain experience in developing and specifying information on layouts. The responses to this question supported those of the previous two, in that, if incorporated into training courses, the graduate would be better prepared to perform the required tasks in layout and copy preparation.

Sex Preference for Layout and Copy Preparation. When asked whether they preferred male or female employees in layout and copy preparation jobs, thirty-six indicated no preference. Ten preferred female employees, claiming that they were neater, more conscious of their work and more dexterous with their hands. Some also indicated that women could sit longer doing this type of detailed work. One indicated that women were better for newspaper quality work, considered lower than commercial work.

Six of those interviewed said they preferred men because they were more mechanically inclined, were easier to communicate with, and their work was better for commercial quality demands.

New Developments in Layout and Copy Preparation. In comparison with other departments those interviewed indicated that there was relatively little expected in the way of technological gains which would affect the work in this area. The only item mentioned frequently, twenty times, was computerized photo composition. It was indicated that this required different handling and more handwork in making corrections. More care would go into preparing the copy and there would be more opportunity for crooked lines to occur. Other possible changes suggested are listed below.

New Developments in Layout
and Copy Preparation

Frequency	Developments
20	Cold type composition
2	New techniques and materials
2	Stat cameras
2	Better waxes and new machines
2	Art display on fonts
1	Repeats on camera
1	Type design
1	More automation
1	Computerized page layouts complete from photo composition machines
1	Illuminated magnifier

Source of Employees in Layout and Copy Preparation. Listed below are the sources of employees as reported in the interviews. Reflected here is the general status of labor supply for all areas of the graphic communications as is evident throughout this report.

Sources of Employees

Frequency	Sources
25	Off the street
13	Other shops
9	Newspapers
8	Employment agencies
7	Schools
5	Art schools
2	Tech schools
1	Unions

The applicant walking in off the street was the most common source. When experienced labor was employed, it generally came from another shop or newspaper. Occasionally, employment agencies supplied experienced applicants. Some company representatives indicated a dissatisfaction with the employees hired through the agency due to the experience of paying placement fees and finding that the new employee was often from another geographical area. After a short time, these people returned to their original home, thus making the experience expensive for the employer. Art schools were mentioned by five as a source of workers. Two indicated that they had hired people from drafting programs in technical schools. Nine indicated that they found people in schools, but without any particular training.

Composition and Imposition

For the purpose of this study, composition, typesetting, and imposition were grouped together in the long form even though it was realized that the actual operations might be quite unrelated in many production situations.

On the post card survey, respondents indicated whether or not they used hot and/or cold type; hot meaning metal type and cold including all non-metal forms of type. Of the companies responding, 371 or 42.06 percent indicated that they used some form of hot type. Cold type was used by 427, or 48.41 percent. Table 13 reveals the extent to which companies of different sizes, who responded to the long form, used these two categories of type preparation. Seventy-one, or 13.57 percent reported doing no composition.

Table 13

Extent to Which Companies of
Different Sizes Use Hot and Cold Type

	Company Size					
Composition	1 - 4	5 - 9	10 - 19	20 - 49	50 +	All Companies
Hot type	*32.50	33.65	47.71	51.88	54.03	42.06
Cold type	37.08	47.87	59.48	59.40	49.19	48.41
N =	240	211	153	133	124	798

*Percent of companies responding in this category.

As well as revealing the extent to which type was set, table 13 indicates that of the 882 companies responding, only 798 set type in any form, leaving eighty-four respondents, or 9.30 percent, not doing any work of this type. When large companies were examined, it was found that nearly twelve percent more were using hot type to some extent. This may be explained by the fact that over twenty-four percent in that group were daily newspapers which are still most commonly letterpress operations.

Table 13 also reveals that small shops of one to four employees were generally less involved with composition work. With the exception of the largest companies, cold composition was consistently reported as being used in more companies of various sizes than hot. The following pages reveal the extent to which these companies used the various composition methods.

The Use of Hot Type. Table 14 reveals the extent to which hand set type, manual line casters, and tape controlled line casters were in use in North Carolina, South Carolina, and Georgia at the time of the study. These data are of particular significance to the development of educational programs as they have been the source of contention for some time.

Table 14

Extent to Which All Companies Used
Metal Composition Methods

Composition	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
Hand set type	*30.71	54.33	8.66	2.36	3.94	381
Manual line casting	40.89	15.97	14.85	10.92	3.57	357
Tape operated line casting	85.96	3.08	4.79	2.74	3.43	292

*Percentage of companies responding in this category.

A glance at table 14 reveals immediately that nearly seventy percent of the companies were still using hand set type to some extent. It is essential to note, however, that this amounted to less than twenty percent of the typesetting in 54.33 percent of the cases. Twenty percent of the shops with one to four employees used hand set type over twenty percent of the time with nearly eleven percent using it over half of the time, which represented the greatest use of this practice. There were some extreme variations from the statistics in table 14, one of which was a finding that eight percent of the companies having over fifty employees used hand set type over eighty percent of the time. Only 15.56 percent of the companies printing over seventy -five percent letterpress used no hand type, while 45.59 percent of those doing over seventy-five percent offset were in this category. Flexographic printers tended to use more hand type than others.

Table 14 also reveals the usage of line casting equipment. Nearly forty-one percent of the respondents did not use manual line casting machines, while 85.96 percent did not use tape operated machines. Seventy percent of the companies with over fifty employees used manual line casters and over twenty-six percent used them for more than half the work. Eighteen percent of the largest companies reported the use of tape controlled line casting machines for over half their work. It should be noted that the response decreased on the line casting items, possibly indicating even less extensive use.

The varied nature of the small shop was evident in the use of manual line casters. Over fifty-one percent with one to nine employees used no manual line casting equipment, and yet 27.14 percent of the one to four shops used manually operated line casters for over half their work.

The Use of Cold Type. It was reported earlier that 48.41 percent of the companies used one or more forms of cold composition. This section of the report outlines the extent to which cold type systems of different classifications were being used.

Table 15 provides an overview of the extent of use of cold type setting systems. The fact that there was considerable use of all classifications reveals the diversity of practices in this area.

Table 15

Extent to Which Cold Typesetting Methods Are Used by All Companies

Composition	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
Strike-on, manual	*53.06	18.65	8.04	8.36	11.90	311
Strike-on, tape	77.27	4.55	4.55	4.20	9.44	286
Photo, manual	43.26	29.15	12.54	6.90	8.15	319
Photo, tape	71.00	5.00	3.67	8.33	12.00	300
Preprinted type	45.40	45.72	7.27	1.32	0.33	304

*Percent of companies responding in this category.

While fifty-three percent of the companies used no manual strike-on equipment, it was also found that as many as 33.90 percent of the shops of one to four employees used this method over fifty percent of the time. This method was clearly more popular with small companies since only 6.46 percent of the largest companies used this system as extensively. Companies with over twenty employees used this method very little.

Tape controlled strike-on composition was only used by 22.73 percent of the respondents to the long form. Contrary to the extensive use of such manually operated systems by small companies, the tape controlled systems were only used by 7.70 percent of the smallest companies for over fifty percent of their work, as compared to 29.82 percent of the companies having ten to nineteen employees. As with manual strike-on composition, the larger companies reported using tape controlled strike-on composition less than twenty-five percent of the time.

Nearly twenty percent of the companies doing over seventy-five percent of their work by offset reported that over half of their type was set on tape controlled strike-on systems, with the exception of one letterpress printer. Those companies printing predominately by the other processes did not use this type setting method at all.

The Use of Photo Composition. This type of composition includes both manual systems, which are often display type sizes or older models of body compositions, and computer assisted tape operated systems for both body matter and headlines. The bulk of the tape operated systems are for the smaller body type sizes. Table 16 presents the extent to which these systems were found to be used.

Table 16

Extent to Which Photo Composition
Was Used by All Companies

Composition	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
Photo composition manual	*43.26	29.15	12.54	6.90	8.15	319
Photo composition tape operated	71.00	5.00	3.68	8.33	12.00	300

*Percent of companies responding in this category.

On examining these data grouped by size of company, it was found that the small companies, under twenty employees, tended to use the manual photo systems somewhat more extensively than the large companies. The manual photo setting systems were in use by at least half of the companies in every size category. Those printing over seventy-five percent by offset or screen printing used the manual system more than major users of the other three processes.

Considerably fewer users of cold type equipment reported having tape controlled machines. Seventy-one percent did no work in this category and this figure was considerably higher for shops of five to nine, 91.53 percent, and one to four, 88.68 percent. Of all the companies using tape controlled photo typesetting equipment, 12.00 percent used it for eighty to one hundred percent of their work. An additional 8.33 percent used it fifty-one to eighty percent of the time. Of the largest companies, 33.83 percent reported over half of their work was done this way as compared to only 3.77 percent of the smallest shops. When data from companies doing over seventy-five percent of their work by one process were examined, it was found that only 11.54 percent of the letterpress printers did over half of their typesetting by tape operated photo setters, as compared to 24.58 percent of those printing predominately by offset.

Preprinted Type. Preprinted type is a slow manual process commonly used in art departments for limited applications. It was found that 54.60 percent of all companies used this medium to some extent, although 45.72 percent used it less than twenty percent of the time. The only appreciable use of preprinted type was by shops of one to four employees. Slightly more than sixteen percent of these used it from twenty-one to fifty percent of the time, while another 4.92 percent used it for fifty one to eighty percent of their work. Table 17 illustrates the use of preprinted type by all companies.

Table 17

Extent to Which Preprinted Type
Was Used by All Companies

Composition	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
Preprinted type	*45.40	45.72	7.24	1.32	0.33	304

*Percent of companies responding to this category.

Use of Repro Proofs for Camera Copy. When asked the extent to which reproduction proofs were used for camera copy, 23.60 percent indicated that this was never done. Over thirty-nine percent of the representatives used them for less than twenty percent of their work, while a total of less than twenty-one percent indicated that over half of their work involved repro proofs. The extent to which repro proofs were used is shown in table 18.

Table 18

Extent to Which Repro Proofs
Were Used for Camera Copy

Number of Employees	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
1 - 4	*31.15	37.71	18.02	4.92	8.20	61
5 - 9	28.17	26.62	16.90	9.86	8.45	71
10 - 19	20.01	38.33	18.33	10.00	13.33	60
20 - 49	24.14	43.10	15.52	12.07	5.17	58
50 +	14.49	42.04	13.04	13.04	17.39	69

*Percent of companies responding in this category.

When companies of different sizes were examined, it was found that the small shops used them less than others. Thirty-one percent of the smallest shops did not use repros, whereas only 14.49 percent of the companies with over fifty employees were not using them. At the other extreme, over thirty percent of the largest shops used repros for half or more of their work as compared to only 13.12 percent of the shops with one to four employees. Twenty percent of the respondents doing over seventy five percent offset reported using repro proofs for over fifty percent of their work. Only twenty-five percent used none. The general finding that over seventy-six percent of all companies were using repro proofs for some of their work, clearly points out that this remains a major graphic reproduction procedure.

Imposition Procedures Used. Depending on processes used and company preferences, imposition might be performed in any number of ways. This study identified three most common methods and obtained data to reveal the preferred approach if one existed. Table 19 provides the responses to these items.

Table 19

Extent to Which Imposition Procedures Were Used

Imposition Procedure	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
Performed at pasteup stage	*30.59	24.34	16.45	11.84	16.78	304
Performed by stripping film	38.38	32.39	14.44	6.69	8.10	284
Hot type forms are imposed	44.94	20.57	14.24	10.44	9.81	316

*Percent of companies responding in this category.

The most commonly used procedure was found to be imposition completed during the pasteup stage. Approximately seventy percent were found to do this at least some of the time, although the extent of this still varied greatly with only 16.78 percent doing over eighty percent this way. Over twenty-five percent of the companies with twenty to forty-nine employees did pasteup imposition over eighty percent of the time.

The next most commonly practices method was imposing during stripping, however, a total of more than seventy percent either did not use this method or used it less than twenty percent of the time. Over fifty-nine percent of the smallest companies never used film stripping procedures for imposition. This was explained to some extent by the fact that only

6.67 percent of this group printed books which lessened the amount of page imposition required. As would be expected, 62.96 percent of those companies printing over seventy-five percent by letterpress reported doing no imposition by means of film stripping.

The least used imposition procedure was that involving imposing while in hot type form. This would be expected since there was less hot type found to be in use. Approximately forty-five percent of the companies indicated that they never performed page imposition with hot type. Sixty-five percent of the smallest companies never used this procedure, however, the practice did become much more common as the size of the company increased. Over seventy percent of the companies with fifty or more employees did some hot type page imposition, and 30.77 percent did this over half the time. This extensive use was only true of the largest companies. Of the companies doing over seventy-five percent letterpress printing, 32.35 percent did over half of their imposing from hot type and 23.53 percent did eighty to one hundred percent this way.

Composition and Imposition Interview Responses

Technical Knowledge Needed. When asked to identify background knowledge which the employees should have to succeed in working with composition and imposition, the most frequently mentioned single need was for a strong background in English. Of particular importance were spelling and rules of punctuation and hyphenation. Mentioned with the second greatest frequency was need for sound principles of layout and design and the ability to plan margins logically. Copyfitting skills and typographic principles were also considered very important. The following list reveals several other items found to be of importance in the opinions of those interviewed.

Technical Knowledge Needed by Personnel
in Composition and Imposition

Frequency	Technical Knowledge
12	Good English, spelling, rules of hypenation and punctuation
11	Layout and design techniques, and margin spacing
9	Copyfitting
8	Typography
7	Hot type, composition and maintenance
5	Principles of photography
4	Photo composition
3	Lock up forms, makeup, repro proofs
2	Imposition
2	Computer and electronic program knowledge
1	Type accurately
1	Math
1	Cold type composition
1	General graphic arts background

Major Problems Encountered in Composition and Imposition. The most frequently mentioned problems were in the area of typesetting details. Such things as spelling errors, improper hyphenation, punctuation and spacing errors were named specifically. Lack of attention to details was a major problem as it was in the layout and design departments. Poorly made reproduction proofs were reported to have been causing lost time. Communication breakdown was again mentioned by several company representatives. Other problems included improper care of equipment, disinterested workers, slow to produce a job and a lack of knowledge of typographic principles which relates directly to design taste.

Major Problems in
Composition and Imposition

Frequency	Major Problems
12	Spelling, hyphenation, punctuation, spacing
8	Exessive errors and lack of attention to details
6	Bad repro proofs
5	Communication breakdown
5	Improper care of equipment and poor maintenance
3	Slow workers

Basic Experiences Recommended for Graduates of Training Programs. The individuals interviewed were asked to identify experiences which people obtaining graphic communications training should have to enable them to succeed in the area of composition and imposition. Mentioned most frequently was basic hands-on experience in hot type handling and preparation. Respondents also desired some work with strike-on processes for setting type. Being familiar with the procedures for preparing composition by these two differing methods was considered essential in light of today's state of the industry. It was further emphasized, however, that training programs should familiarize the student with the hot and hand set methods of letterpress without spending excessive time, since these procedures were felt to be clearly on the decline. The majority of demands were expected in areas requiring handling of cold type composition for pasteup.

Also considered important was experience in typography planning and selecting type for a given job. Planning imposition for small jobs, as well as taking part in designing such jobs was recommended as fundamental training. Doing letterpress lock ups and pulling repro proofs was also recommended as fundamental training. These experiences would appear logical in light of the current practices in use as revealed in the long form data presented on the preceding pages.

The entire list of recommended experiences is presented below.

Basic Experiences Recommended

Frequency	Basic Experiences
11	Hot type operations and principles
7	Strike-on composition
6	Design and imposition layout
6	Hand set type
5	Typography
5	Lock up and reproduction proofing
5	Operation of composition equipment
3	Pasteup
1	Drafting
1	Math
1	Terminology

The cost of photo composition equipment was considered a problem when it came up during interviews. A possible solution was offered by the investigator which met with a generally favorable response. The idea offered was for the training program to provide experience in keyboard operation for preparing tapes. If keyboard systems were carefully selected for compatibility with local industries, these tapes could be run during idle time on the company's photo typesetter, thus avoiding the necessity for schools to invest in expensive black boxes likely to be used very little. This approach appeared to have some merit for the high school level. Another point came out in this regard. That was that applicants with training in typing would be preferable for keyboarding type on photographic composition systems over others since this was considered a specialty area. A good background in English was still considered essential.

Sex Preference for Composition and Imposition. When asked whether there was any preference of male or female employees, twenty-two expressed no preference, twenty-two specified male employees and seventeen preferred females. Men were generally preferred in the hot type areas due to the heavy, manual type of work done. Females were preferred for such work as cold type setting, pasteup, proofreading, paper and film handling. They were reported as having better finger desterity than men, and also capable of more tedious types of work.

New Developments in Composition and Imposition. New developments in the production departments must be considered when long range plans are made for the implementation of education programs. The composition area has been undergoing dynamic changes ever since the introduction of photocomposition. As reported earlier, approximately thirty percent of the companies studied were found to be using tape operated photo typesetters. When asked to identify new developments, fifty-eight of those interviewed considered developments in cold composition, generally photographic, the most significant in terms of their potential effect on manpower training. The increased use of electronics and computers was emphasized frequently. Increased availability and use of optical character recognition systems and more cathode ray typesetters were mentioned specifically by some representatives. These developments would certainly increase greatly the production per man hour and thus affect a decrease in numbers of people actually setting type.

Also mentioned was more application of magnetic tape, increased mixing capability on photo setters, new methods of making zincs for rubber plates and more use of teletype setters.

New Developments in
Composition and Imposition

Frequency	New Developments
58	More cold type photographic, computers
4	OCR, CRT
1	Mixers and mergers for cold type computer systems
1	New methods for making zincs for rubber plates
1	Increased use of teletype setters

Sources of Employees. The primary source of employees was said to be the applicant off the street. The next most frequently mentioned source was other shops. This was particularly true of experienced operators in the hot type area. Advertisements and schools were mentioned with next greatest frequency. Several company representatives mentioned hiring typists for keyboarding work. These and other sources are shown in the following list.

Sources of Employees in Composition
and Imposition

Frequency	Sources
22	Off the street
15	Other shops
10	Advertisements
8	Schools
4	Typists
4	Employment agencies
2	Referrals
2	Other departments in the plant

Photographic Department

Grouped within the photographic department were continuous tone photography, all reproduction photography procedures, and stripping. In examining all data for this section, it was ascertained that 134, or 25.62 percent of the 523 respondents to the long form did no photographic work at all. When examined by companies doing seventy-five percent in a single process, only 18.18 percent of the offset companies as compared to 55.00 percent of the letterpress companies reported no photographic work being done.

The Use of Continuous Tone Photography. The first item in this section sought to determine the extent to which graphic arts industries engaged in the creation of their own black and white halftone copy. Much to the surprise of the investigators, only 32.80 percent indicated that this continuous tone work was never done, although 50.94 percent of the smallest shops were in this category. It should be noted, however, that the larger the company, the more common was this practice with 30.77 percent of those having over fifty employees reporting that they did over eighty percent of this work themselves. The reader is again reminded that a fourth of these large companies were daily newspapers. Twenty-five percent of all shops indicated doing over eighty percent of this work. Unlike most operations, companies appeared to either do a great deal of this or very little as revealed in table 20.

Table 20

Companies Doing Continuous Tone Photography for Halftones

Operation	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
Continuous tone photography	*32.80	23.47	14.15	4.50	25.08	311

*Percent of companies responding in this category.

The Use of Line and Halftone Photography. Line photography was by far the most common photographic operation with more than ninety-five percent of the respondents engaged in it.

Table 21 reveals the extent to which it was in use.

Table 21

Extent to Which Companies Were
Engaged in Line and Halftone Photography

Operation	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
Line photography	* 4.40	9.92	14.88	19.28	51.52	366
Contacting	18.02	41.85	11.22	4.76	24.15	294
Halftone using contact screen	13.61	23.37	13.02	9.17	40.83	338
Veloxes	44.40	36.95	10.17	1.36	7.12	295
Halftones using glass screen	76.43	12.14	5.36	0.36	5.71	280
Densitometer readings on halftone work	66.43	6.29	5.25	4.20	17.83	286

*Percent of companies responding in this category.

Upon examination of the table, it is found that 51.52 percent marked the over eighty percent category indicating extensive work in line photography. Of the shops with twenty to fifty employees, fifty-nine percent were doing line work over eighty percent of the time.

Contacting was found to be in considerably less extensive use by companies of all sizes with the smaller companies doing less than larger ones. Twenty-eight percent of the smallest companies did no contacting, a figure which decreased consistently with increases in number of employees to 6.45 percent of the largest companies. This was clearly not the most important of darkroom practices as indicated by the fact that 41.85 percent of the respondents marked the less than twenty percent column on the long form. When companies printing over seventy-five percent by a single process were examined, the only outstanding observation was that all the screen printers checked over fifty percent. This might be explained by the fact that screen printers work from positive film rather than the more commonly used negative form.

The photographic operation found to be the second most used was halftone photography using the contact type halftone screen. Only 13.61 percent of the respondents reported no use of this operation. Of the smallest companies, 25.42 percent indicated no use of contact screens. Only twenty-four percent of these small shops reported over eighty percent use of contact screens as compared with 40.83 percent for all respondents, thus supporting a conclusion that the smallest shops were consistently less involved in photographic work. Companies printing over seventy-five percent by offset used contact screens considerably more than others printing extensively by a single process. Forty-seven percent reported over eighty percent use of this operation compared to 13.04 percent of the primarily letterpress printers.

In analyzing the activities of the photographic departments for the purpose of planning educational programs, it was of interest to the investigators to learn the extent to which veloxes, or dot prints, were being used. Table 21 reveals that only 7.12 percent were making extensive use of this method, whereas 44.40 percent were doing none at all. Of the smallest companies, none were in the eighty percent or over category, while 61.22 percent made no use of veloxes. Among the most extensive users of this process were the newspapers.

Due to the fact that text materials continue to make reference to glass cross line halftone screens, it was of importance to this study to ascertain the extent to which they were still in use by the industry. Table 21 quickly reveals this to be a little used procedure for making halftones with 76.43 percent reporting none at all. Only 5.71 percent reported over eighty percent use of glass screen and most of them were the larger shops with over twenty employees. Eighty-three percent of those printing primarily by offset reported no use of this method.

The last item in table 21 reveals the extent to which densitometers were reported to be in use. Table 22 provides a breakdown showing the relationship between company size and use of densitometers for reading halftone copy.

Table 22

Extent to Which Companies of Different Sizes Used Densitometers

Number of Employees	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
1 - 4	*86.67	2.22	2.22	.....	8.89	45
5 - 9	86.44	5.09	3.39	1.69	3.39	59
10 - 19	74.54	7.27	3.64	1.82	12.73	55
20 - 49	65.44	5.46	3.64	5.46	20.00	55
50 +	30.97	9.86	11.27	9.86	38.03	71

*Percent of companies responding in this category.

Examination of table 22 reveals a tendency for larger shops to use densitometers more than smaller shops. The practice of reading copy with the densitometer is clearly not a standard as yet, although in the larger copanies it appeared to be significant tool with forty-eight percent using them over half the time. Responses varied greatly among companies doing different types of work; for example, 52.38 percent of the daily newspapers responding reported using densitometers over eighty percent of the time, while only 28.57 percent reported no use of this equipment. In contrast, 82.35 percent of those producing weekly newspapers used no densitometers in the photographic department.

In recent years multicolor special treatments of continuous tone copy have become quite popular. These were referred to in this study as special effects when the companies were asked to indicate the extensiveness of their use. Table 23 reveals the responses of companies of various sizes.

Table 23

Extent to Which Multiple Color Special Effects Were Used

Number of Employees	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
1 - 4	*67.39	32.61	.....	.....	....	46
5 - 9	46.55	37.93	8.63	.....	6.89	58
10 - 19	36.36	43.63	9.09	1.83	9.09	55
20 - 49	29.31	48.27	8.62	3.45	10.35	58
50 +	26.09	47.82	5.80	7.25	13.04	69

*Percent of companies responding in this category.

Upon examination, this table reveals another direct, positive relationship between company size and the extent to which special effects were produced in the photographic department. It was of interest to find that over sixty percent of all the respondents to the item were doing some of this work, although not extensively in any company size category. Of those companies printing by offset over seventy-five percent of the time, 11.43 percent checked the over eighty percent column, as compared to 8.36 percent for all respondents. As in the case of other photographic practices, the daily newspapers reported more extensive use of these techniques with 18.18 percent in the over eighty percent column on the long form.

Table 24 contains data representing the extent to which the respondents were involved in certain more specialized operations.

Table 24

Extent to Which Specialized Photographic
Operations Were Used

Operations	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
Screened positives	*44.68	37.23	5.68	1.42	10.99	282
Indirect screen color separations	83.70	8.70	1.44	.....	6.16	276
Direct screen color separations	84.89	9.71	0.72	0.36	4.32	278
Dot etching	83.82	7.72	1.48	1.10	5.88	272

*Percent of companies responding in this cateogry.

The first operation identified in table 24 is the extent to which screened positives were being made by photographic departments. Being somewhat more specialized, it was found that only 10.99 percent of the companies checked the over eighty percent extent of use; although, as with other photographic operations, approximately seventeen percent of the companies with over twenty employees were doing this over eighty percent of the time. Forty-five percent of all respondents did no work with screen positives and the smallest companies, one to four employees, sixty-four percent were not doing this.

Of the companies printing by offset over seventy-five percent of the time, 12.43 percent were making screened positives extensively. Twenty percent of the daily newspapers and twenty-seven percent of those offering any service to the trade in photography, reported making screened positives over eighty percent of the time. Only fifteen percent of the daily newspapers did not make screened positives.

The practice of making color separations was of interest in light of the increased use of full color printing. Of the 276 respondents to the item regarding indirect screen color separations, 83.70 percent reported no work with this separation. Ninety-four percent of the smallest shops did none. Only six percent of the companies indicated extensive work with indirect separation. Of the companies who reported offering any trade services, 23.33 percent indicated doing extensive work with indirect screen separations. Fourteen percent of those doing package printing indicated over eighty percent use of the indirect screen separation process.

Direct screen color separations were found to be in use somewhat less than indirect, although the largest companies actually did this work more extensively with 10.94 percent in the over eighty percent category. Eighty-five percent of all respondents did no direct screen color separations. Forty-seven percent of the daily newspapers used the direct screen separation process to some extent with 21.05 percent reporting extensive, over eighty percent, use of the process.

A procedure of great interest to some, it was found that 83.82 percent of the respondents did no work of this nature, although 25.81 percent of the largest companies did do some dot etching. Eleven percent of these marked the eighty to one hundred percent category indicating that for at least some companies, this was a common practice. The last three operations were most likely even less common than the figures indicated due to the fact that a large number did not respond to the items.

Processing Methods in Use. Teaching graphic arts, as with any other trade or industrial subjects, is subject to the criticism of teaching outmoded techniques. Mechanization of photographic processing has been heavily publicized in the recent literature causing one to question the extent to which such procedures are in use. Table 25 reveals the extent to which respondents processed their materials by tray, stabilization, and automatic film processors.

Table 25

Extent to Which Processing Methods Are Used

Processing	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
Tray	*24.27	13.59	6.15	4.53	51.46	309
Stabilization	68.61	13.87	5.84	1.83	9.85	274
Automatic film	76.84	1.41	2.80	1.05	17.90	285

*Percent of companies responding in this category.

The most common processing procedure in terms of numers of shops was found to be conventional tray processing with over seventy-five percent doing it to some extent. The large companies were found, however, to be doing considerably less than others with forty-three percent doing none at all. Over half of all companies indicated that they did tray processing over eighty percent of the time, although only seventeen percent of the largest companies were included in that group. It was most interesting to note that only 17.39 percent of those printing over seventy-five percent of their work by letterpress used tray processing over eighty percent of the time. This was mainly due to the large number of daily newspapers in that group, forty percent of whom did no tray processing. Only twenty-five percent of the daily nespapers used tray processing extensively.

Stabilization processing, which is generally not a replacement for either tray processing or other automatic film processing, was found to be in use by only thirty-one percent of the respondents most of whom had over ten employees. The greatest use was in the company having ten to nineteen employees, where 17.24 percent reported over eighty percent use of stabilization processing. It should be noted that a number of respondents and people interviewed were found to be unaware of this process. Of the companies who printed over seventy-five percent by a single process, only the offset printers reported significant use of stabilization processing; 11.31 percent used it over eighty percent of the time.

While stabilization processing can be used for a wide variety of applications, it is most commonly used for continuous tone or black and white photography. This was evident when data for daily and weekly newspapers were examined. Of the weekly papers, thirty-one percent reported its use over eighty percent of the time, as compared to only 9.85 percent for all respondents. Another twelve percent responded in the fifty to eighty percent category. Of the daily newspapers, only twenty-six percent made no use of this process while sixteen percent checked the column of most extensive use, over eighty percent.

While automatic film processing has not been in use for many years, it was found to be in use very extensively. Table 26 reveals the extent of its use by companies of given sizes.

Table 26

Extent to Which Automatic Film Processing Was Used

Number of Employees	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
1 - 4	*97.78	.....	.....	.....	2.22	45
5 - 9	91.67	3.33	5.00	.....	.....	60
10 - 19	91.23	.....	.....	.....	8.77	57
20 - 49	71.42	1.79	1.79	1.79	23.21	56
50 +	40.91	1.51	6.06	3.03	48.49	66

*Percent of companies responding in this category.

The largest companies, which would be expected to process considerable quantities of film, were doing the greatest portion of their work this way in over fifty percent of the cases. Companies with twenty to forty nine employees were also found to be using automatic film processing, although 71.43 percent still reported no use of this method at all. Daily newspapers reported extensive use of automatic film processors with 57.14 percent in the over eighty percnet category. Only thirty three percent did not have such processors. Thirty percent of the companies who reported offering some service to the trade, were found to be using automatic processors over eighty percent of the time.

Photographic Department Interview Responses.

The interview items for reproduction photography were fewer than for other areas due to the extensiveness of the data obtained by the long form. The stripping interview information was obtained separately and reported following this section.

Major Problems Encountered in the Photographic Department. When asked to identify the major problems encountered related to the work done in the photographic department the following items were identified.

Major Problems in the Photographic Department

Frequency	Major Problems
24	Lack of technical knowledge
15	Cannot make good line or halftone negatives
6	Slow to produce work
5	Sloppy work habits
5	Problems caused by poor communcations
3	Lack of knowledge of special effects techniques
2	Improper scaling of reproductions

The camera department was found to have undergone some of the most dramtic changes with the increased use of sophisticated lighting controls, densitometers and automatic processors as well as the introduction of a vast array of new materials. These changes have greatly increased the demand for camermen who know the theories in order to establish standards and use the mulitude of new materials and techniques. This, in addition to the simple lack of ability to do the basics of line and halftone work, was the fundamental problem most of them mentioned. Other items reflected a simple lack of basic training. It was interesting to note the repeated identification of communications breakdown as a major problem.

New Developments in the Photographic Department. The new developments reported most often, by fourteen, were automatic processors. Mentioned with the second most frequently were two items, the development of new materials, and the availability of more automatic cameras with superior lighting and lighting controls. These and other recent developments felt to be causing increased demands on the cameraman are listed on the following page.

New Developments in the Photographic Department

Frequency	New Developments
14	Automatic processors
10	Automatic cameras with better lighting and controls
10	New materials and chemicals
4	New preparess proofing materials
3	Increased use of direct screening color separations
2	More use of photodirect plates
1	New techniques such as posterizations
1	New systems- PMT, machine processes

Sex Preference for the Photographic Department. When asked whether there was any preference of male or female employees, twenty-five indicated no preference, while twenty preferred male. Three indicated a preference for female workers in this area. The general feeling was that men worked better in confined areas. A few of the representatives expressed concern for having male and female working together in the darkroom area. The investigators drew no conclusions on this topic, although this practice is already common in the schools.

Source of Employees in the Photographic Department. As in previous departments, the source of labor was primarily off the street, reported by twenty-four. The labor supply came to twelve of the companies interviewed from other shops. These and other sources are shown below.

Sources of Employees

Frequency	Source
24	Off the street
12	Other shops
7	Newspaper advertisements
6	Other production departments within the company
5	Schools
2	Amateur or commercial photographers
2	Military
2	Employment agencies
1	PICA newsletter
1	Unions
1	Referrals

Stripping Operations

One of the most important operations generally managed under the photographic department is stripping. For the purpose of this study, stripping was broken down into three categories; simple line stripping, multicolor, and process color. Table 27 reveals the extent to which respondents reported doing these three operations.

Table 27

Extent to Which Stripping Was Performed

Operations	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
Simple line stripping and masking	* 5.46	10.01	13.63	13.63	57.27	330
Multicolor stripping and masking	19.54	32.11	14.24	7.29	26.82	302
Process Color stripping and masking	40.91	27.27	9.44	3.15	19.23	286

*Percent of companies responding in this category.

Line stripping was the most commonly performed operation with 94.54 percent doing it to some extent. Fifty-seven percent indicated that this made up over eighty percent of their work in this area. The smaller the company, generally the larger was the portion of line stripping reported. Only 44.23 percent of the largest companies reported this extent of simple line stripping. Approximately nineteen percent of the companies having over fifty employees reported that line stripping made up less than twenty percent of this type of work.

Sixty-two percent of the companies doing over seventy-five percent of their work by offset reported over eighty percent of their stripping was simple line work. There were no major variations in the responses of printers examined in production categories, for example: trade shops, newspapers, and others.

Multicolor stripping was somewhat less common, although eighty percent of all companies did report doing this type of stripping to some extent. The larger the company, the more frequent the practice of multicolor stripping with 92.65 percent of the largest companies doing some, with thirty-five percent doing it over eighty percent of the time. Evidence of the varied nature of the small shop was again found as thirty four percent did no multicolor stripping, while at the same time nineteen percent reported that over eighty percent of this work was multicolor. Considerably variation was observed in the extent to which companies doing work in different production categories responded to this item on the information form.

Table 28 reveals the major variations found.

Table 28

Multicolor Stripping Done by Companies in Selected Production Categories

Production Categories**	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%
Weekly newspapers	*40.00	28.57	11.43	2.86	17.14
In-plant printing	25.53	36.17	17.03	6.38	14.89
Trade service	12.50	28.11	15.63	9.38	34.38
Daily newspapers	9.52	47.62	14.29	.....	28.57
Book printing	8.33	41.68	14.58	14.58	20.83
Package printing	6.67	26.67	6.67	13.32	46.67
All respondents	19.54	32.12	14.24	7.28	26.82

*Percent of companies responding in this cateogry.
**These categories are not mutually exclusive. Many companies do work in two or more categories.

Package printers reported considerably more work in multicolor stripping with over forty-six percent doing it more than eighty percent of the time. The weekly newspaper and the in-plant printer reported far less activity in this area, with forty percent of the weekly papers doing no multicolor work at all. Book printers, as one might expect, did multicolor stripping, but to a considerably lesser extent than other types of operations.

It is immediately evident that this procedure was not used by as large a portion of the industry as other stripping operations, although six out of ten companies did engage in it to some extent. While only nineteen percent of all companies did over eighty percent of their stripping on color jobs, as many as thirty-six percent of the largest companies were found in this extensive use category. Shops of one to four employees did very little work of this type. Nearly eighty percent of these smallest companies reported doing no process color stripping.

Table 29 reveals the extent to which companies were involved in stripping process color.

Table 29

Extent to Which Process Color Stripping Was Performed

Number of Employees	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
1 - 4	*79.55	6.81	4.53	.....	9.09	44
5 - 9	51.67	25.00	10.00	3.33	10.00	60
10 - 19	34.55	40.00	1.82	3.63	20.00	55
20 - 49	24.19	35.49	17.74	4.84	17.74	62
50 +	26.56	23.44	10.94	3.12	35.94	64

*Percent of companies responding in this category.

Table 30 reveals the variation found in the extent to which companies in different production categories perform process color stripping.

Table 30

Process Color Stripping Done by Companies in Selected Production Categories

	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%
Weekly newspapers	*54.55	33.33	3.03	.....	9.09
In-plant printing	51.11	28.89	6.67	4.44	8.89
Trade services	29.03	29.03	6.45	3.23	32.26
Book printing	27.27	36.36	13.64	9.09	13.64
Package printing	21.43	28.57	7.14	7.14	35.72
Daily newspaper	15.00	50.00	5.00	.....	30.00

*Percent of companies responding in this category.

Those companies engaged in package printing and which had photographic departments reported the greatest use of process color, with approximately forty-three percent indicating over fifty percent of the time. Of the trade services, 32.26 percent reported that over eighty percent of their stripping was process color. Weekly newspapers and in-plant printers reported the least use of this operation with 54.55 and 51.11 percent respectively indicating that none was being done. Of those printers doing some extent of book printing, only 27.27 percent did no color stripping, although the extent of their use of this operation varied considerably.

Stripping Interview Responses

Technical Knowledge Needed. The interviews included a series of questions delving into the nature of the work in the stripping area and the particular needs of the industry in this operation. The item mentioned most frequently, by sixteen representatives, was the necessity for knowledge of the press and its limits such as clamp area, grippers, and image limits. Twelve indicated the need for a stripper to know page layout for imposition since this was often performed at the stripping stage. Eleven indicated that knowledge of multicolor registry and process color stripping was important, while three more added pin registry, which might be included with the color work. Understanding the flow of a job and being able to visualize the finished job was reported by nine; and a knowledge of layout principles by eight. These were the most emphasized items of technical knowledge found to be important to employers. The following list represents the responses regarding technical knowledge needed by those preparing to be strippers in the industry.

Technical Knowledge Needed by
in Stripping

Frequency	Technical Knowledge
16	Press capabilities, gripper margins
14	Multicolor registry, process color registry, and pin registry
12	Page layout for imposition
9	See the job as a finished product
8	Layout principles
8	Drafting
7	Bindery operation, stock and grain
7	Handling films
5	Math, use of rule
5	Know basic stripping procedure and equipment
3	Understand screen use
2	Step and repeat
2	Plate problems
2	Photo process

It was quite clear upon completion of the interviews that stripping was one of the most important jobs in terms of the needs of the printing industry. The work of this area affected that of the entire production sequence and knowledgeable manpower was a problem for many.

Major Problems in Stripping. The second question regarding stripping, identified the problems which companies experienced most often in the department. The list below shows that the most frequently experienced problem was general carelessness evidenced by sloppy work. Mentioned along with this was the slow speed at which work was being done. Technical errors were grouped into a category together and were found to be the next most frequently mentioned problem in the stripping. These problems included such things as crooked negatives, negatives upside down, opaquing mistakes, repeats which did not register and general lack of precise accuracy. Tape too close, or overlapping halftones was a common problem.

Major Problems in Stripping

Frequency	Major Problems
20	Carelessness, sloppy work, slow
15	Bad stripping, crooked upside down, opaquing
7	Communications breakdown
5	Lack of knowledge about press features
3	Tape next to halftones
2	Cannot recognize bad negatives
1	Improper stepping
1	Inability to see the entire job
1	Inability to measure accurately

Lack of knowledge of the press limits, grippers and other significant specifications was cited as a major problem. As in other areas the problems associated with communication failure were mentioned as significant problems by some of the representatives interviewed.

Basic Experiences Recommended for Graduates of Training Programs. After the problems had been identified, the company representatives were asked to list the experiences the graphic communcations student should obtain in the area of stripping. A list of their suggestions will appear on the following page.

At the top of the list, general experience on the light table preparing negatives and positives for plate making was stressed as an essentail part of any training program. Such activities as line stripping, measuring, working with T-square and triangle and opaquing were specified.

Basic Experiences Recommended

Frequency	Basic Experiences
18	General light table work and knowledge of opaquing
13	Strip combinations, multicolor work
9	Understand camera to plate
9	Capabilities of press
7	Bindery, folding, and imposition
4	Drafting and math
4	Process stripping theory or actual
4	Step and repeat
4	Design background
3	Pin registry
3	Recognize bad negatives
2	Stripping two sided forms
1	Stripping to film
1	Ruling

Mentioned with second greatest frequency was work with multicolor forms and combinations. As in other production departments, the next two most frequently reported items had to do with knowing about the work of other departments so as to better do the job which is related to those departments. Camera and press work were said to be directly related to stripping since many companies relied upon strippers for camera quality control as well as the inherent responsibility for providing the allowances required on the presses. Experiences in planning for imposition and binery requirements, such as folding sequence and trimming allowances were reported with next greatest frequency. This was followed by process color stripping and application of practical mathematics. It was generally agreed that students should be required to make the plates and run the work they had stripped to experience any of the problems, or success they had built into the job when it was stripped. The ability to interpret the layout and visualize the product was considered important to success in stripping.

Sex Preference for Stripping. There was almost no preference expressed regarding the sex of employees in stripping except for a few cases. Eight indicated men were more desirable in this area than women, although some of these gave the reason as being the fact that strippers were also cameramen and they did not want men and women working in the camera area together. Some also indicated this preference simply because they had not tried a woman in that work before. Six preferred women, giving as their reason, the experience that women could sit in one place and do the neat and exacting work required of strippers better than men could.

New Developments in Stripping. There were very few new technological developments considered to be coming which would have an effect on the stripping operation. The only item mentioned frequently was the step and repeat machine or changes to it. This equipment is not new, although certain refinements toward greater automation were indicated by a few to promise some change for the worker. Other technical developments mentioned were new ways to proof plates, new stripping materials, registry control systems and miniaturization of negatives and flats. The mention of more photodirect application to large plates earlier in this report has a bearing, as well on the work of the stripper since this type of development could act to bypass stripping altogether.

New Developments in Stripping

Frequency	New Developments
11	Step and repeat system
4	Mechanical stripping
2	Ways of proofing plates
2	New materials
2	Registry control
1	Miniaturization of negatives and flats

Source of Employees in Stripping. Listed below are the sources of employees for work in the stripping area, with the street and pirating from competition shops found to be the two most common supply sources. Reported with considerably less frequency were the vocational and technical schools, although discussion revealed that some of these were from drafting programs rather than graphic communication courses. Newspaper advertisements were found to provide some success in locating workers for the stripping department. Most companies indicated that training, often extensive, had to be provided in the plant in order to have qualified strippers.

Sources of Employees

Frequency	Source
15	Off the street
15	Other shops
15	Employment office
8	Tech schools
8	Newspaper advertisements
4	Other departments
1	Referrals

Printing Plates

The section on printing plates on the long form was broken down by major printing processes. Respondents were asked to indicate the extent to which printing was done using the various types of image carriers. If the respondent was not using a particular process, he was given the opportunity to so indicate.

Letterpress Plates. There were five items in this area which covered the major image carriers of letterpress printing. According to the post card survey, 546 or 61.91 percent of the responding 882 companies were printing by letterpress. There were 189 or 36.14 percent of the 523 respondents to the long form which indicated that no printing was done by letterpress. Table 31 indicates responses of all companies to these items.

Table 31

Extent to Which Printing Was Done Using Letterpress Image Carriers

Letterpress Image Carriers	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
Hand-set type	*18.40	59.72	12.15	5.56	4.17	288
Linotype and/or intertype slugs	13.09	23.15	18.12	16.78	28.86	298
Sterotype plates	68.69	19.16	3.28	2.80	6.07	214
Zinc plates	36.99	38.20	10.98	4.48	9.35	246
Photo-polymer plates	87.83	5.29	0.52	3.18	3.18	189

*Percent of companies responding in this category.

With regard to printing from hand-set type, 172 or 59.72 percent of the 288 companies responding to this item reported using this means of printing less than twenty percent of the time. This was also true when companies were examined by size categories. There was no major deviation from this with regard to companies involved in different phases of printing. This would tend to indicate that hand-set was being used by all types and sizes of companies, but not to a great extent. The use of hand set type for headings may account for some of this use.

There were 298 or 56.98 percent of the 523 companies that responded to the item on the use of linotype and/or intertype slugs for printing. One hundred and thirty-six, or 45.64 percent of these companies reported printing by this method over half of the time. This same amount of time was given to the use of linotype and/or intertype slugs by 53.19 percent of the forty-seven companies that were doing over seventy-five percent letterpress as a single process. Over forty-eight percent of those companies doing general commercial and book printing were using these slugs for printing over fifty-one percent of the time. All other types of companies were not using this method as extensively.

Stereotype plates were in use by less than thirty-two percent of the 214 printers that responded to this item. The companies that did use these plates most often were those with fifty or more employees. As could be expected, the daily newspapers were the companies that were using stereotype plates to the greatest extent.

Small companies were using zinc or copper plates in the categories of over fifty-one percent of the time, less than the larger companies. There were 155, or 63.01 percent of the 246 companies that responded to this item, that were using these plates. There were 49.18 percent of these companies printing with zinc plates less than fifty percent of the time. Of the sixteen companies that reported doing some package printing, 42.75 percent were using zinc or copper plates over fifty percent of the time. Most other companies reported considerably less usage of this means of printing.

Photo-polymer plates were in use by only 12.17 percent of the 189 companies that responded to this item. Of the usage observed, the larger companies were doing more printing using these plates than were the smaller companies. Package printers were accounting for some of this use.

Offset Plates. There were six items under the category of offset plates ranging from the simple to more sophisticated types of plates. Sixty-eight, or thirteen percent of the 523 companies completing the form indicated that no offset work was done in those plants. Of the 882 companies that returned the post card survey, 744 or 84.35 percent indicated that some offset was being done. Table 32 shows the responses of all companies as regards use of various image carriers.

Table 32

Extent to Which Printing Was Done Using Offset Image Carriers

Offset Image Carriers	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
Direct image masters	*51.81	30.61	8.49	3.94	5.15	330
Photo-direct plates	50.63	13.12	14.38	8.44	13.44	320
Presensetized plates	6.00	13.75	11.00	15.75	53.50	400
Wipe-on plates	61.47	9.24	6.05	3.18	20.06	314
Deep-etch plates	83.33	9.93	1.42	0.71	4.61	282
Letterset (Dry offset) plates	93.23	5.26	1.13	0.38	.....	266

*Percent of companies responding in this category.

The response to the item concerned with the use of direct-image masters showed that less than fifty percent of the 330 companies reporting, were printing by this means. The larger companies were using direct image masters least of all sizes of companies.

Photo-direct plates were being used by less than fifty percent of all companies. Larger companies reported using these plates the least. The greatest usage of these plates was reported by companies providing fast print service. Of the seventy-one reporting companies in this phase of printing, 50.70 percent were using photo-direct plates from fifty to one hundred percent of the time. This was to be expected because of the type of while-you-wait service offered by such companies.

Of the 400 companies that responded to the item regarding the use of presensitized plates, 214 or 53.50 percent indicated using them over eighty percent of the time. There were 131 or 52.19 percent of the 251 companies using offset over seventy-five percent of the time, that were in this same category. Over fifty percent of those companies that reported doing some general commercial, package printing, book publishing and trade service work reported using presensitized plates between eighty and one hundred percent of the time.

Companies with ten or more employees reported using wipe-on plates more than the small companies, although only just over thirty percent of these companies were using these plates over fifty percent of the time. Weekly newspapers used wipe-on plates more extensively than others with 47.73 percent reporting their use for over eighty percent of the work. Forty-four weekly papers responded to this item. Eleven or 81.62 percent of the thirteen responding daily newspapers indicated using these plates over eighty percent of the time.

There were 235 or 83.33 percent of the 282 printers that responded to the item on deep-etch plates that were not using these plates at all. Those companies that were using these plates were the large printers.

Letterset plates were being used by only eighteen or 6.77 percent of the 266 printers that responded to this item. All of these companies were using these plates less than eighty percent of the time, while the majority were using them less than twenty percent of the time. More large companies were using letterset plates than small companies.

Platemaking Interview Responses

Technical Knowledge Needed. The responses given during the interview in the area of platemaking were mainly for offset printing, since letterpress image carriers were discussed under composition and imposition. The most frequently mentioned item of important technical knowledge was an understanding of chemistry as it pertains to the platemakers job. Types of plates and their uses along with proper platemaking procedures were given emphasis with next greatest frequency. Other important items are shown in the list on the following page.

Technical Knowledge Needed by
Personnel in Platemaking

Frequency	Technical Knowledge
20	Chemistry
13	Types of plates and their uses
13	Plate making procedure for exposure, double burns
8	Press sizes
4	Layout and stripping
4	Step and repeat
4	Recognize good plates
3	Metalurgy
2	Math
1	Care in coating
1	Camera work

Major Problems Encountered in Platemaking. The greatest problems come about as a result of a lack of the above mentioned technical knowledge regarding procedure and processing. Sloppy work habits and inaccuracy was most often mentioned, followed closely by poor processing and rough handling. The following list will point out other problems less often mentioned, but still problems to the printer that values quality workmanship.

Major Problems in Platemaking

Frequency	Major Problems
10	Sloppy habits and inaccurate work
9	Poor processing and rough handling
3	Bad registry; step and repeat
3	No knowledge of plates and chemistry
2	Failure to include screens and overburns
2	Cannot recognize bad plates

Basic Experiences Recommended for Graduates of Training Programs. Printers want to see graduates have an understanding of plates, what a plate does and how it works. Exposing and processing procedures were also stated as being important experiences for the graduate. Other important experiences are as follows.

Basic Experiences Recommended

Frequency	Basic Experiences
10	Knowledge of plate exposure and processing procedures
5	Chemistry of metal
4	General job flow camera to press
3	Knowledge of press ability and size

2	Step and repeat
2	Dot structure
1	Knowledge of ink and paper
1	Reaction of ink and water
1	Punch registry

Sex Preference for Platemaking. Most company representatives preferred males for platemaking due to the sizes of plates and the strong chemicals involved in the work. Although an equal number of twenty-three companies stated that either male or female would be suitable, two companies reported a desire for female platemakers because they would be better suited for seasonal work common to those companies.

New Developments in Platemaking. Automatic processors and exposure units, along with continued improvements in plates and chemicals were among the new developments most often mentioned. Driography was mentioned, but still seem to be in the future as far as major use was concerned.

New Developments in Platemaking

Frequency	New Developments
16	Automatic processors and exposure units
5	Different types of plates
5	Better chemicals, light sensitive materials
2	Driography
2	Plastic plates

Sources of Employees in Platemaking. As with other areas in graphic arts, the majority of platemakers are hired right off the street with others coming from a variety of sources.

Sources of Employees

Frequency	Sources
20	Off the street
7	Employment agencies
6	Other shops
5	Schools
3	Other departments
2	Referrals
1	Unions

Gravure Plates. Included on the long form were two items regarding the extent to which gravure was in use. From the information gained from the post card survey, nine companies indicated printing by gravure. Seven of these were companies with fifty employees or more. The following data will show that some companies using gravure failed to indicate this on the post card survey.

Of the 523 companies that completed the long form, 481 or 91.97 percent indicated that they did not use any type of gravure printing plates.

Table 33

Extent to Which Printing Was Done Using Gravure Image Carriers

Gravure Image Carriers	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
Gravure cylinders	*57.14	9.52	9.52	.....	23.81	21
Engraved plates	70.59	11.77	.....	5.88	11.77	17

*Percent of companies responding in this category.

When asked the extent to which gravure cylinders were used for printing, five or 23.81 percent of the twenty-one companies responding to this item indicated that gravure cylinders were used eighty to one hundred percent of the time. Twelve companies, or 57.14 percent reported that they never used gravure cylinder for printing.

Those companies that were using gravure cylinders were predominately the larger companies, with three of them being in the fifty and over category, and one in the twenty to foty-nine employee category. There was one company in the one to four employee category that reported using gravure cylinders over eighty percent of the time. Three of these companies were doing some package printing, while two were doing general commercial work. Four of the larger companies indicated that they were using gravure cylinders only on a limited basis. Of the forty-two companies involved in the use of gravure, there were seventeen companies responding to the item concerning the use of engraved plates. Of these, twelve companies indicated that no engraved plates were used. Only three of the reporting seventeen companies indicated the use of engraved plates.

Flexography Plates. The long form contained a single item to determine the extent of use of flexography printing plates. From the post card survey, twenty or 2.27 percent of the 882 companies indicated printing by flexography. Those companies which completed the long form and circled the column indicating no use of flexography plates totaled 466 or 89.10 percent of the 523 companies responding. Table 31 indicates a total of forty-four or 8.41 percent of the 523 companies responded to the item on use of rubber printing plates.

Table 34

Extent to Which Printing Was Done
Using Flexographic Plates

Flexography Image Carrier	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
Rubber printing plates	*45.45	13.64	4.55	.....	36.36	44

*Percent of companies responding in this category.

Of these, sixteen or 36.36 percent were using these plates from eighty to one hundred percent of the time. Ten of these sixteen companies were in the category with fifty employees or more.

Of the sixteen companies heavily involved in using rubber printing plates, seven or 43.75 percent were doing some package printing. There were six companies that were doing in-plant and commercial printing that indicated using rubber printing plates over eighty percent of the time. Eight companies were using flexography on only a limited basis, less than fifty percent of the time.

Screen Printing Plates. Four items covering the various stencils used for screen printing were included on the long form. From the post card survey, forty-nine or 5.56 percent of the responding 882 companies indicated doing some screen printing. Companies of all types were doing some screen printing, although generally to a limited extent. There were thirty-six or 6.88 percent of the companies completing the long form that did screen printing. Table 35 indicates the responses of these companies.

Table 35

Extent to Which Screen Printing Was Done
Using Various Types of Stencils

Screen Printing	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
Paper stencils	64.71	23.53	5.88	2.94	2.94	34
Hand-cut film	36.11	41.67	11.11	2.78	8.33	36
Photographic transfer stencils	32.35	23.53	11.77	11.77	20.59	34
Direct emulsion photo-stencils	51.61	19.36	6.45	3.22	19.36	31

Thirty-four companies responded to the item concerned with the use of paper stencils. Of these, twenty-two or 64.71 percent never used paper stencils. Only two companies used paper stencils over fifty-one percent of the time, one of which is in the category of doing over seventy-five percent of all his work by the screen printing process.

The item concerning the use of hand-cut film drew a response from thirty-six companies, thirteen or 36.11 percent of which indicated no use of this type of stencil. For the most part, the larger companies made use of hand-cut film stencils to a limited extent, while companies with nine or less employees used this method with increased frequency.

Twenty-three or 67.65 percent of the 34 responding companies, indicated some use of photographic transfer stencils. Almost half of these were using this method from fifty-one to one hundred percent of the time. Six, or seventy-five percent of the eight companies with production time amounting to over seventy-five percent in the area of screen printing, reported using photographic transfer stencils over fifty-one percent of the time.

It is interesting to note that of the 286 companies doing over seventy-five percent offset printing, eleven or 3.84 percent were also screen printing using photographic transfer stencils to some extent. There were four companies that were doing some general commercial work and two each that were in-plant and fast print service printers that indicated using this method over eighty percent of the time. All of these companies employed less than fifty persons. This would tend to indicate that this stencil method was used from eighty to one hundred percent of the time. Included in these six companies were those that did some fast print, general commercial, trade and weekly newspaper work.

Screen Printing Interview Responses

From the personal interviews, screen printers stated that those persons involved in handling image carriers or screens and adhering screens need to have a technical knowledge of inks and solvents. A knowledge of screen materials such as silk and which types of inks are best used with the different types of screens would also be valuable.

The major problem facing the screen printer is adhering the stencil material to the screen. Improper cleanups and grease on the screen add to this problem. Men are preferred for the work, due to the size and weight of some of the screens used. Electrostatic printing was mentioned as a coming development in the screen printing field.

Presswork

There were sixteen items of information sought on the long form in the area of presswork. The first four items covered the amount of printing done, as well as a look at the graduations from simple line work to critical registry process color printing. The remaining items covered various operations performed in the pressroom, as well as operations other than printing alone. Of the 523 companies that completed the form, thirty-one or 5.93 percent indicated that no presswork was done in those plants. These companies included those specialty trade shops and those which did work preliminary to the press and jobbed the printing out. Table 36 shows the range and complexity of printing done by all companies.

Table 36

Extent to Which Printing Was Done
in Selected Categories of Work

Type of printing	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
Single color line work	*2.40	12.64	20.70	28.31	35.95	459
Single color work with halftones	4.32	40.91	31.36	11.14	12.27	440
Two or more colors in register	4.89	45.11	26.67	10.00	13.33	450
Process color	39.70	38.42	10.42	4.84	6.62	393

*Percent of companies responding in this category.

The item concerning printing of single color line work drew a response from 459 or 87.76 percent of the 523 companies. There were 295 or 64.26 percent of these companies that indicated doing single color line work over fifty-one percent of the time. As could be expected, the small companies were doing more work of this nature than the larger companies. There were 78.10 percent of the 105 smallest companies in the over fifty one percent category, as opposed to 44.58 percent of the companies with fifty or more employees. This trend will be shown to change as the complexity of printing and multiplicity of color lay down increases over the next three items. It was interesting to note that 65.02 percent of the 258 companies that are doing over seventy-five percent offset were in the category of doing single color line work over fifty-one percent of the time. There were 62.93 percent of the responding fifty-four companies in the over seventy-five percent by letterpress category that responded in this manner. The question might be asked at this time: was this because of the fact that there were more small companies in the three state labor market area than large companies? Also, does this mean that students in graphic arts programs should stop at the single color line work stage of printing?

When companies were examined by the type of printing done, over sixty percent of most types of companies were printing single color line work over fifty-one percent of the time. Package printers and daily newspapers were exceptions to this. Also trade shops and in-plant printers were doing over sixty-eight percent of their printing in this category.

As could be expected, 42.55 percent of the forty-seven companies that were printing weekly newspapers were printing single color line work with halftones over fifty-one percent of the time. Next in line were seven, or 35.00 percent of the twenty daily newspaper printers. Of all responding printers, 72.78 percent of the 440 companies indicated doing this less than fifty percent of the time. There were generally fewer small companies doing this work to a great extent than large companies.

Those companies doing over seventy-five percent by offset were in the same category possibly indicating that there were more smaller companies doing a majority of offset work than other size companies.

Of the 450 companies that responded to the item concerned with printing, two or more colors in register, 323 or 71.78 percent indicated that this was done less than fifty percent of the time. Smaller companies were doing considerably less of this type work than the larger. As the companies stepped up in size, the amount of work of this nature increased accordingly. Only thirty percent of most all types of companies reported printing two or more colors in register over fifty-one percent of the time with the exception of the package printers. Eight or 57.69 percent of the reporting twenty-six companies of this type showed a high usage of multicolor printing in register.

Over eighty percent of the reporting seventy-one companies with four or less employees did not do any process color press work, as compared with 39.70 percent of all 393 reporting companies.

By contrast, there were 78.48 percent of the seventy-nine reporting companies with over fifty employees that were doing some process color work. There were twenty or 25.32 percent of those companies that were printing process color from eighty to one hundred percent of the time. There were only thirty-two or 13.73 percent of the 233 companies that were printing by offset over seventy-five percent of the time that were doing process color printing over fifty-one percent of the time. Again, this would tend to indicate as previously pointed out that the majority of the companies in the over seventy-five percent printing by the offset process category were also the smaller printing companies. Table 37 shows the extent to which various operations were performed in the pressroom.

Table 37

Extent to Which Pressroom Operations Were Performed

Operations	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
Test offset fountain solutions for pH	37.90	26.08	7.52	4.84	23.66	372
Densitometer reading on press sheets	72.82	10.08	5.02	4.20	7.84	357
Use offset spray powder	23.63	26.12	16.92	10.95	22.38	402

In comparing the responses of companies to the item, "test offset solutions for pH," it was found that with increases in company size there was a corresponding increase in the use of this test. There were only eight or 10.53 percent of the seventy-six companies in the one to four employee category that were using this test. This compares with thirty three or 47.14 percent of the seventy companies with over fifty employees. Those companies doing trade and package printing reported the highest usage of the pH test.

Of the 357 companies responding to the item, "take densitometer readings on press sheets," there were only ninety-seven or 27.18 percent of those companies that indicated doing any of this work. Once again, the small companies were doing the least of this with sixty-eight or 93.15 percent of the seventy-three responding companies indicating that none of this was done. The larger companies were doing more work of this type, although fifty or 57.14 percent of the seventy reporting companies with fifty or more employees indicated doing this either not at all or less than twenty percent of the time.

This trend continued to hold true for the responses to the item on the use of offset spray powder. Of the 523 companies that returned the form, 402 or 76.86 percent responded to this item. Thirty-seven or 50.69 percent of the seventy-three companies of fifty or more employees indicated using spray powder over fifty-one percent of the time, while only ten or 11.90 percent of the eighty-four smallest companies were in this category. The percent of companies using spray powder increased with the increase in size of companies. Those companies doing some package printing were high in this category with seventeen or 68.00 percent of twenty-five companies indicating the use of offset spray powder over fifty-one percent of the time.

The next two items on the long form surveyed the use of conventional molleton dampening systems and non-molleton type dampening systems. Table 38 compares the responses of all companies to these items.

Table 38

Extent to Which Dampening
Systems Were in Use

Dampening systems	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
Conventional molleton	*19.73	10.27	14.05	11.08	44.87	370
Non-molleton	54.17	10.71	12.80	6.85	15.47	336

*Percent of companies responding in this category.

The molleton system uses the thick cotton fabric as a covering for the ductor roller. Non-molleton systems employ some other method of water transfer, such as the Dahlgren alcohol water system.

Over fifty-five percent of all companies with up to forty-nine employees, indicated the use of conventional molleton dampening systems from fifty-one to one hundred percent of the time. By contrast there were twenty-six or 38.24 percent of the sixty-eight companies with over fifty employees that were in this category.

The item on the use of non-molleton type of dampening systems showed that there were 34.72 percent of the seventy-two responding small companies that were using this system to any extent. By contrast, there were 62.90 percent of the sixty-two responding largest companies that were using the system over fifty percent of the time. The usage of the non-molleton type system was shown to increase with corresponding increases in company sizes.

The remaining items in the section on presswork in the long form were concerned with various press operations. Covered were numbering, perforating, die-cutting, embossing, slitting, sheeting of roll stock and printing on non paper materials. The data for these operations are shown in table 39.

Table 39

Extent to Which Miscellaneous
Operations Are Performed on the Press

Operations	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
Numbering	*34.87	29.06	17.19	6.05	12.83	413
Perforating	26.20	41.35	14.90	6.01	11.54	416
Die-cutting	45.84	33.75	7.81	3.53	9.07	397
Embossing	79.11	14.20	2.51	1.67	2.51	359
Slitting	63.39	22.13	3.83	3.55	7.10	366
Sheeting roll stock	85.96	4.49	3.93	1.13	4.49	356
Print on non paper materials	70.59	22.19	2.41	1.33	3.48	374

*Percent of companies responding in this category.

Of the 413 companies that responded to the item on numbering, 65.13 percent were doing this to some extent. The majority of companies regardless of size were doing numbering less than fifty percent of the time.

The item on perforating on the press drew a similiar response. There were 73.80 percent of the 416 responding companies that were doing this on the press. The largest segment of companies reported in the less than twenty percent category.

There were 54.16 percent of the 397 companies that were die-cutting on the press. Again, the largest group were doing this less than twenty percent of the time. This did not vary with company size.

Embossing was done by 20.89 percent of the responding 359 companies. Generally, the larger companies were doing slightly more in this area than smaller companies, but not to a significant degree.

As the size of the companies increased, the amount of slitting done also increased. On the whole, there were only 36.61 percent of the 366 companies that performed operations of this type. The larger amount of slitting done by the larger companies might be due to the larger press sizes and capabilities.

As with slitting, the larger companies were predominant in the response to the amount of sheeting of roll stock done. Of the 356 responses to this item, only 14.04 percent indicated that this was done to any extent. This compares to 31.88 percent of the sixty-nine companies in the category of over fifty employees that were performing this operation. Again, this could be due to the larger press sizes and capabilities which the large companies possess.

There were 374 companies that responded to the item concerned with printing on non-paper materials. Of all of these companies, 29.41 percent indicated doing this to some extent. The larger companies made up the majority of those in this category. Although, there were more companies in the less than twenty percent category than any other.

Presswork Interview Responses

Technical Knowledge Needed. The most frequently mentioned item in the personal interview with the representatives of the industry, was a working knowledge of inks and paper. This was followed closely by a basic knowledge of chemistry as it applies to ink and water balance, pH and alcohol dampening systems. These were some of the basics a pressman needed in order to run consistent quality work. A mechanical ability to perform routine maintenance was also high on the list of desired technical knowledge. These and other things mentioned are incorporated into the following list.

Technical Knowledge Needed by
Personnel in Presswork

Frequency	Technical Knowledge
30	Ink and paper
26	Chemistry of pH, ink and water balance, and alcohol dampening systems
24	Mechanical ability
14	Inks, types and matching colors
9	Principles of offset
9	Packing
7	Registry
6	Make-ready
5	Nomenclature of presses
3	Roller settings and pressures

2	Plates
2	Handling paper
1	Lock-up
1	Numbering
1	Use of offset spray
1	Unwind and rewind of roll stock

Major Problems Encountered in Presswork. A lack of consistent quality was most often mentioned as the major problem encountered, followed closely by waste, carelessness, ink, paper and water balance problems. It can be seen that these are closely related to the technical knowledge mentioned above. If a man has the proper technical knowledge for the job, it can possibly be said that his problems would greatly decrease.

Basic Experiences Recommended for Graduates of Training Programs. The leading experience that the industry wanted to see was some experience in running presses. Although most of the industry is using larger presses, it was shown that work on smaller presses would begin to give students a basis of pressmanship. Next mentioned in frequency was a familiarity with ink and paper. Included here were things like mixing inks and handling paper. Other items mentioned are shown in the following list.

Basic Experiences Recommended

Frequency	Basic Experiences
25	Hands-on experience on presses as well as duplicators
11	Ink and paper handling
9	Fundamentals of printing and types of problems
7	Run and register multicolor work
5	Mechanical background
5	Understand color theory
5	Set fountain solutions and ink
3	Plate making and plate handling
3	Makeready
3	Clean up and care of presses
2	Run process color
1	Run a variety of jobs, ie. screens, halftones
1	Cost and time study
1	Handling paper
1	Take densitometer readings

Sex Preference for Presswork. In the area of presswork, the male was preferred over the female by forty-three representatives. Five exceptions were made, but only for operations of small presses or duplicators. Men were preferred due to the heavy work involved and the mechanical skills necessary.

New Developments in Presswork. The following list shows that the most frequently mentioned item under new developments was the continued introduction of newer and better equipment and materials. Driography was frequently mentioned, but it was noted that many refinements were necessary before extensive use was practical.

New Developments in Presswork

Frequency	New Developments
10	New dampening systems, papers, plates
9	Driography
6	Increased automation
5	Speed
5	Computer control
2	Better chemicals and inks
2	Better feeding systems
2	Better web presses

Source of Employees in Presswork. As with other departments, the majority of the employees for the pressroom were hired right off the streets, followed in frequency by other shops. Experienced pressmen were said to be rare and usually come from the other shops locally or nationally, with some companies bringing in men from Europe. Those coming in off the street usually start as helpers, loaders or stackers. Other sources are shown as follows.

Sources of Employees

Frequency	Sources
24	Off the street
16	Other shops
7	Newspaper advertisements
4	Schools
3	Referrals
2	Employment offices
1	Other departments within the company

Bindery and Finishing

The section covering the bindery and finishing operations of companies completing the long form was an attempt to determine the extent of work performed in this area. Three hundred and seventy-one companies or 42.06 percent of the 882 companies completing the post card survey, indicated some type of bindery work being done. Of the 523 companies that completed the long form, eighty-four or 16.06 percent indicated that there were no bindery or finishing operations performed.

There were five items relating to bindery and thirteen relating to the finishing operations. The extent of the use of bindery operations is shown in table 40.

Table 40

Extent to Which Bindery Operations Were Performed

Operations	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
Mechanical binding	*42.45	29.56	11.95	4.40	11.64	318
Hard bind books by hand	72.67	17.33	5.67	.....	4.33	300
Make book covers	75.69	16.76	4.80	0.69	2.06	292
Hard bind books by machine	93.26	3.19	1.78	0.71	1.06	282
Perfect binding	83.57	7.50	4.64	1.43	2.86	280

*Percent of companies responding in this category.

To the item regarding the use of mechanical binding, 318 or 60.80 percent of the 523 companies responded. Of those 318 companies, 135 or 42.45 percent reported that no work of this type was done. There were fifty one companies or 16.04 percent that reported doing mechnical binding from fifty-one to one hundred percent of the time. It should be noted that as the percentage of work increases, the percentage of response decreases. This will be shown to follow for the five items in the bindery section.

Of the companies doing over seventy-five percent by a single process in offset printing, there were thirty-three or 17.10 percent of the 193 companies that responded to this item, that were using mechanical binding procedures over fifty-one percent of the time. Six or 26.09 percent of the twenty-three companies doing letterpress printing over seventy-five percent of the time, that responded to this item, were also doing mechanical binding over fifty-one percent of the time.

The response to the item concerned with hard binding of books by hand showed that the majority of companies that did this work, did it less than fifty percent of the time. In fact, 218 or 72.67 percent of the 300 companies responding, indicated that this was never done. Only sixty-nine or 23.00 percent of these companies indicated hard binding books by hand up to fifty percent of the time. Here again, as the amount of work increased, the number of companies decreased.

There were 282 or 53.91 percent of the 523 companies that completed the long form that responded to the item regarding doing hard binding of books by machine. Of these, there were only nineteen or 6.74 percent that were doing any of this type work, while half of these were doing it less than twenty percent of the time.

The data seemed to parallel the previous findings in the bindery operations with regards to those companies making book covers. Sixty three or 21.56 percent of the 292 companies responding to this item, indicated performing this operation less than fifty percent of the time, while 75.69 percent of the responding companies were not making any book covers.

There were 280 or 53.54 percent of the 523 companies responding to the long form that responded to the item concerned with the perfect binding operation. Two hundred and thirty-four or 83.57 percent of those responding companies indicated that there was no perfect binding done in their plant. Twelve or 4.29 percent of the companies indicated doing perfect binding over fifty-one percent of the time. It is interesting to note that of the 171 companies responding this item which were doing over seventy-five percent of the work by the offset process; eight were doing perfect binding over fifty-one percent of the time.

A comparison of table 40 with table 41 shows that for bindery operations performed over fifty-one percent of the time, the majority of these were companies engaged in offset printing over seventy-five percent of their production time.

Table 41

Extent to Which Bindery Operations Were Performed by Companies Doing Over 75% by the Offset Process

Operations	None	Less Than 20%	21% to 50%	51% to 80%	Over 80%	N=
Mechanical binding	*41.45	30.05	11.40	4.15	12.95	193
Hard bind books by hand	75.00	16.30	2.72	.....	5.98	184
Hard bind books by machine	92.98	3.51	1.75	0.59	1.17	171
Make book covers	76.27	15.25	5.09	0.57	2.83	177
Perfect binding	82.46	7.60	5.26	1.76	2.92	171

*Percent of companies responding in this category.

As shown in table 42, most all companies were doing some types of finishing operations.

Table 42

Extent to Which Finishing Operations
Were Performed by All Companies

Operations	Freq.	Percent
Trimming	430	*97.95
Folding	424	96.58
Padding	422	96.13
Collating	422	96.13
Drilling	397	90.43
Perforating	388	88.38
Gathering	379	86.33
Punching	368	83.83
Numbering	323	73.58
Glueing	239	54.44
Die-cutting	203	46.24
Tipping	190	43.28
Foil stamping	27	6.15
N=	439	

*Percent of companies responding to this item. Most all companies were doing more than one operation.

Four hundred and thirty-nine or 83.94 percent of the 523 companies indicated use of bindery and finishing operations to some extent. The finishing operations of trimming, folding, padding, collating and drilling were being done by over ninety percent of the reporting companies. It was noted that these oerations were in extensive use by most all companies, regardless of size or major printing process. From the frequencies and percentages noted, it can be seen that most companies are involved in finishing operations to an extent, whether or not any actual binding is done.

From the interviews, it was learned that most major bindery work is sent to specialty shops.

Bindery and Finishing Interview Responses

Technical Knowledge Needed. From the representatives of the industry in the three state region, it was learned that there was a decreasing use of major book binding operations in all types and sizes of companies. A general knowledge of paper and its characteristics was the most frequently mentioned item of value under the technical knowledge of the bindery. Secondly, a good mechanical background was deemed important especially for the man who would be operating bindery equipment. An overall understanding of printing and finishing was the third most mentioned item. If employees were aware of the total printing operation, it was stated that they would be more efficient in their jobs. Other items that were mentioned are listed as follows with decreasing frequency.

Technical Knowledge Needed by Personnel
in Bindery and Finishing

Frequency	Technical Knowledge
17	Paper knowledge and characteristics
14	Mechanical background
11	Understand printing and finishing
5	Set up and make ready of machinery
5	Knowledge of equipment capabilities
5	Signature imposition
4	Math
4	Layout of forms for folding
4	Cutting
3	Die-cutting
2	Glues and gum stocks
2	Run collator
1	Laminating
1	Drills - corners
1	Good margin spacing
1	Ink drying
1	Quality control

Major Problems Encountered in Bindery and Finishing. Carelessness was the most frequently mentioned problem in this area. Employees not watching what they are doing or doing things that are obviously wrong were included here. Improper setups and poor communications were second with equal frequency. The list on the following page covers other problems in their order of mention.

Major Problems in Bindery and Finishing

Frequency	Major Problems
9	Carelessness
5	Improper set ups
5	Communications
4	Scheduling
3	Lack of knowledge of paper
2	Lack of technical knowledge
1	Too slow
1	High waste
1	Wet ink
1	Cutting errors
1	Assembling errors
1	Bad handling

Basic Experiences Recommended for Graduates of Training Programs. A knowledge of the variety of jobs performed in the bindery area was mentioned with the greatest frequency by representatives of the industry. Experiences on setting up and operating machines, such as folders, cutters, and stitchers, was next most frequently mentioned. A variety of other practical experiences was desired as is shown in the following list.

Basic Experiences Recommended

Frequency	Basic Experiences
12	Know a variety of jobs in the bindery
8	Folding machine set ups
7	Cutting
5	Saddle stitching
4	Die-cutting make ready
3	Know sizes and grades of paper
2	Run collators
2	Page imposition
2	Handling paper
2	Padding and glueing
1	Hand bind signatures
1	Read layouts for folding

Sex Preference in Bindery and Finishing. When asked if there was a preference for male or female employees in the bindery, thirty-six representatives of the industry indicated that either would be suitable, while seven preferred females and two preferred males. The choice for a female in the bindery was usually qualified by the fact that females are better at repetitive type hand work so prevalent in bindery and finishing operations. Males were desired for machine operators and cutters as well as heavy work.

New Developments in Bindery and Finishing. The major new developments mentioned were in the area of automation and speed of operation. New machines also ranked high. Other developments are as follows.

New Developments in Bindery and Finishing

Frequency	New Developments
5	Speed
5	Automation
5	New machine processes
3	Folded signatures delivered off of the press
2	Computer controls
2	More perfect binding
1	Die-cutting press which completely strips waste
1	Faster, easier set ups

Sources of Employees in Bindery and Finishing. By far, the greatest number of employees for the bindery area came in off the street. Several representatives mentioned that employees start in the bindery and work up into other departments in the plant, such as the pressroom. Operators of specialized equipment often come from other shops. One company mentioned using employees from a local vocational rehabilitation center. Other sources are as follows.

Sources of Employees

Frequency	Sources
32	Off the street
5	Other shops
3	Referrals
3	Schools
3	Employment Agencies
3	Other departments within the plant
1	Vocational rehabilitation center

CHAPTER V

PERSONNEL PREPARATION

Technical Background

Among the questions to which answers were sought in this study were two concerning the preparation needed for sales and management personnel. These questions were: (1) "What technical knowledge is needed by employees in sales and management positions?" and (2) "What skills and knowledge are desired of sales and management personnel?" The items in this section consisted of a list of possible types of backgrounds and possible responses as to their importance in the preparation of sales personnel on the one hand, and management people on the other. The shops having no sales personnel specifically, such as in-plant printers and some of the smallest companies, left the sales portion of the long form blank. Some of the companies, smaller ones particularly, omitted this section entirely. The overall response was good and the findings were rather interesting as they pointed out the intense desire of the industry for broadly prepared personnel.

The first series of items sought to determine the extent to which sales and management personnel should understand the overall flow of work through the major printing processes. Table 43 reveals the responses of all companies to these items. An initial scan of table 43 reveals the somewhat greater needs of management than sales personnel for understanding of major process production flow. The significance of offset as the the leading process and letterpress as the second was reflected in these data as 292 or 80.66 percent of the respondents indicated that a knowledge of offset work flow was essential for managers. Only twenty-five percent indicated this degree of significance for sales people. Very few respondents directed no importance to knowledge of the offset process, although a considerable number did consider such a knowledge of letterpress to be unimportant.

The reader will note the extreme decrease in the extent to which importance was placed on screen printing, flexography and gravure, especially for sales personnel. Over thirty-three percent of all respondents did consider knowledge of these processes to be either desirable or essential for management. Approximately half indicated that this was not important. The importance placed on screen printing was of interest in particular, since this is actually the smallest volume productive process by most reports. When the data were examined for companies of different sizes, no particular differences were noted in their responses to these items. Data obtained from companies who produced over seventy-five percent of their work by a single process reflected the importance of whichever the particular process was. For example, companies doing over

Table 43

Extent to Which Sales and Management Personnel Should
Understand the Flow of Work Through the Major Processes

	Sales				Management			
Flow of Work Through:	*1	2	3	4	1	2	3	4
Offset	**3.91	6.36	37.90	51.83	2.49	.83	16.02	80.66
Letterpress	14.43	17.47	43.29	24.81	9.12	7.97	26.50	56.41
Screen printing	54.85	26.12	12.32	6.71	44.00	16.00	18.40	21.60
Flexography	66.28	17.05	11.24	5.43	50.41	15.58	13.93	20.08
Gravure	67.19	16.61	11.46	4.74	51.03	15.64	14.40	18.93

*1 Not important.
2 Sometimes beneficial.
3 Desirable.
4 Essential.

**Percent of companies responding in this category.

Table 44

Extent to Which Sales and Management Personnel Should Have
A Basic Knowledge of Selected Technical and
Business Aspects of the Trade

	Sales				Management			
Basic Knowledge Needed	*1	2	3	4	1	2	3	4
Cost analysis	**14.51	17.94	37.47	30.08	2.79	4.75	18.71	73.74
Quality control methods	15.68	24.32	43.78	16.22	3.14	6.00	26.86	64.00
Copy preparation procedures	4.57	12.18	39.09	44.16	1.93	7.69	31.04	59.34
Present typesetting systems	9.36	16.36	46.75	27.53	2.82	7.88	34.37	54.93
Economics	13.78	25.41	37.03	23.78	4.31	7.32	26.59	61.78
Common pressroom problems	15.69	26.60	38.83	18.88	3.09	7.59	29.21	60.11
Graphic design principles	4.01	12.28	46.62	37.09	2.80	10.08	38.66	48.46
Accounting	22.13	28.96	36.07	12.84	5.71	9.44	33.14	51.71
Common bindery operations	15.38	20.06	44.51	20.05	7.87	8.75	32.94	50.44
Reproduction photography	10.18	25.75	37.80	26.27	5.25	13.99	35.57	45.19
Types of plates and their applications	24.18	29.67	31.04	15.11	4.05	15.60	32.95	47.40
Imposition procedures	22.29	24.34	35.19	18.18	12.38	14.86	32.82	39.94
Process color separation	24.07	32.09	30.95	12.89	18.84	17.03	33.13	31.00

*1 Not important.
2 Sometimes beneficial.
3 Desirable.
4 Essential.

**Percent of companies responding in this category.

seventy-five percent letterpress printing unanimously indicated that management should know the production flow of letterpress printing. These respondents, printing predominately by one process, did not differ greatly from the total population in the importance they placed on the other four major processes for managers and sales personnel.

The next part of the survey dealing with sales and management personnel preparation obtained an indication of the relative importance placed on having a basic knowledge of selected technical and business aspects of graphic communications. Table 44 reveals the overall responses to this item. The total responses indicated that every item was considered either desirable or essential as it applied to the needs of management personnel. The importance of any one item did not stand out particularly since all were rated so high. All items were indicated to be considerably more important for management than for sales personnel.

The least important for management were knowledge of process color separation and imposition procedures. The highest ranked in terms of importance was cost analysis and quality control methods, with copy preparation procedures ranked third in the columns labeled desirable and essential.

There were only minor variations in the data when examined in groups based on company size. The items found to be considerably less important for sales than management, however, were still rated high by the majority of respondents. All but three basic knowledge areas were rated desirable or essential for sales personnel by over fifty percent of all respondents. These were accounting, types of plates and their applications, and process color separation. The highest rated knowledge areas for sales were: (1) graphic design principles, (2) copy preparation procedures, (3) present typesetting systems, and (4) cost analysis. Companies of various sizes differed very little in their responses with the exception of the largest ones, which appeared to have been somewhat less typical. Those companies with over fifty employees placed less importance on bindery, design, types of plates, and typesetting, and more on process color.

In summary, it was found that companies generally expressed a desire for both sales and management personnel having a broad basis of knowledge about the graphic arts reproduction processes, as well as some background in economics and cost analysis.

In pursuing the needed backgrounds of sales and management personnel further, respondents were asked to indicate the extent to which first hand experiences in five selected production areas was needed. Table 45 reveals the responses to these items. A first look at table 45 reveals the fact that companies generally desired people in both sales and management to have first hand experience in graphic reproduction areas. As was the case in the previous section of this report, management personnel were found to need experience in somewhat more cases than sales. Planning and design were found most important for both sales and management. However, the responses were very uniform when percentages of desirable and essential were combined. Finishing was indicated to be not important by more respondents than any other category, although only in the case of sales was the figure over twenty percent.

When data were examined by company size categories, it was of interest to note that the smallest shops, having one to four employees, marked the columns desirable and essential consistently higher than the overall industry. Both sales and management were marked in this way. Due to the

Table 45

Extent to Which Sales and Management Personnel Need Experience in Graphic Reproduction Areas

	Sales				Management			
Experience in:	*1	2	3	4	1	2	3	4
Planning or design	**4.60	19.96	49.10	26.34	2.00	14.86	37.43	45.71
Copy preparation	5.66	17.22	47.56	29.56	2.30	15.57	38.33	43.80
Finishing	21.15	31.05	37.09	10.71	6.97	13.33	36.97	42.73
Reproduction photography	14.95	29.62	40.21	15.22	5.37	20.90	34.03	39.70
Prepress and presswork	16.67	32.80	34.66	15.87	4.03	16.72	32.28	46.97

*1 Not important.
2 Sometimes beneficial.
3 Desirable.
4 Essential.

**Percent of companies responding in this category.

Table 46

Comparison of Experience Needed by Sales and
Management Personnel in Large and Small Companies

Small Companies with 1 - 4 Employees

	Sales				Management			
Experience in:	* 1	2	3	4	1	2	3	4
Planning or design	** 1.52	16.67	53.02	28.79	1.52	10.60	27.27	60.61
Copy preparation	4.61	13.85	53.85	27.69	....	13.85	27.69	58.46
Finishing	11.87	27.12	45.76	15.25	3.33	8.33	33.33	55.01
Reproduction photography	8.48	28.81	44.07	18.64	3.33	13.33	31.67	51.67
Prepress and presswork	5.00	26.67	38.33	30.00	1.61	9.68	29.03	59.68

Large Companies with 50 + Employees

	Sales				Management			
Experience in:	1	2	3	4	1	2	3	4
Planning or design	4.94	29.63	43.21	22.22	4.16	27.78	37.50	30.56
Copy preparation	7.41	23.46	37.03	32.10	5.64	23.94	46.48	23.94
Finishing	26.31	32.90	34.21	6.58	16.67	16.67	30.39	27.27
Reproduction photography	18.18	33.77	33.77	14.28	10.29	32.35	33.82	23.53
Prepress and presswork	20.50	41.02	29.49	8.99	8.70	27.53	33.33	30.44

*1 Not important. 3 Desirable.
2 Sometimes beneficial. 4 Essential.
**Percent of companies responding in this category.

nature of the small shops, the average having only 2.73 employees, including sales and management functions, the workers would be expected to perform in considerably more areas than workers in larger shops. In fact, the companies with over fifty employees indicated somewhat less need for actual experience than others. Table 46 provides these data from small and large companies for the purpose of comparison.

Educational Background

To ascertain the backgrounds and qualifications of labor in the graphic arts was one of the objectives of the study in which this section of the long form was directed. In this section, the personnel in graphic arts were broken into the four traditional areas: management, sales, skilled and unskilled occupations. A possible limitation to this part of the long form was that employees have varied backgrounds causing difficulty for some respondents in specifying the "typical" background within the company. At the time of the study, the industry reported that the majority of its managerial level personnel held a college degree. Over fifty percent of the companies with twenty or more employees were in this category. Those companies with from one to four employees indicated that the managers were, for the most part, high school graduates or had attended post high school training at the non degree level.

With regard to the desired education of future employees in management, the college degree man was preferred with a greater percentage of response in this category than the managers with college degrees at the time of the study. Table 47 illustrates this shift.

Table 47

Comparison of the Present and Desired Educational Backgrounds of Management Personnel

All Companies	Background Less Than grade 12	High school graduate	Post high school non degree	College degree	Graduate degree	N=
Present	* 2.25	22.29	29.86	41.10	4.50	489
Desired	0.21	11.68	20.59	59.45	8.70	471

*Percent of companies responding in this category.

It was noted that the small companies wanted either post high school training or college level training with about an equal percentage of response.

A comparison of the responses to the college degree man in the table will show the rise in the desired educational level for managerial personnel. It will also be noted that there was a slight rise in the desire for men with a graduate degree. The larger companies were responsible for this rise.

The next item on the long form dealt with the education of sales personnel. The largest single group of companies at the time of the study indicated that their salesmen had post high school training at the non degree level. As with the management level, the small companies again reported a lower educational level for salesmen, with the majority having a high school education. Table 48 reveals the responses of all companies to the items regarding education of sales personnel.

Table 48

Comparison of the Present and Desired Educational Backgrounds of Sales Personnel

	Background					
All Companies	Less Than grade 12	High school graduate	Post high school non degree	College degree	Graduate degree	N=
Present	*1.97	31.10	37.50	28.47	0.96	418
Desired	0.23	13.26	37.21	47.44	1.86	430

*Percent of companies responding in this category.

As shown in the above table, there was a desire expressed for a shift toward salesmen with college degrees for the future. The small companies indicated a satisfaction with salesmen who were high school graduates or had some post high school work. Over fifty percent of all other companies preferred a college graduate for sales positions.

At the skilled occupation level, 76.17 percent of the responding 470 companies indicated high school graduates were filling these positions.

As shown in table 49, there was a rise in the education desired for the skilled occupations. But there was nearly an equal balance between companies that preferred high school graduates and those that preferred non degree post high school training.

Of the 438 companies that responded to the item on the typical educational background of unskilled occupations, 283 or 64.61 percent reported that high school graduates were typical at this level. It was also interesting to note that 136 or 31.05 percent of the companies reported that employees in these occupations had less than a high school education.

Table 49

Comparison of the Present and Desired Educational Backgrounds of Skilled Occupations

All Companies	Background Less Than grade 12	High school graduate	Post high school non degree	College degree	Graduate degree	N=
Present	*3.83	76.17	17.02	2.98	.....	470
Desired	1.27	46.71	45.86	6.16	.....	471

*Percent of companies responding in this category.

As shown in table 50 below, the trend reported by all companies showed an increase in the percentage of response for high school graduates for the unskilled occupations. The drop in the percentage of employees with less than high school degree should be noted, as well as an increase in the desire for employees with post high school education.

Table 50

Comparison of the Present and Desired Educational Backgrounds of Unskilled Occupations

All Companies	Background Less Than grade 12	High school graduate	Post high school non degree	College degree	Graduate degree	N=
Present	*31.05	64.61	2.97	1.37	.....	438
Desired	10.60	74.62	13.24	1.54	.....	453

*Percent of companies responding in this category.

Trade Training

In addition to determining the educational background of graphic arts employees, the study was to determine the formal trade training of employees in management, sales, skilled and unskilled occupations. Again, the respondent was faced with the possible problem of selecting the "typical" training when actual training may have included several of the possible categories.

The the time the study was conducted, there did not appear to be a single source of formal trade training for management personnel. Although, of the 445 companies responding to this item, 24.72 percent indicated management had no formal training, while 41.13 percent indicated training at either the college non degree level or college degree level.

This was contrasted with the 70.58 percent of the 418 companies that desired college non degree or college degree formal trade training for future managers. It was interesting to note that over fifty-nine percent of the large companies of twenty employees and over desired college level trade training for management personnel. Small companies were not as high in this area. Table 51 makes the comparison of present and desired trade training for all companies.

Table 51

Comparison of the Present and Desired Formal Trade Training for Management Personnel

All Companies	Trade Training None	High school	Post high school	Military	College non degree	College degree	N=
Present	*24.72	12.13	17.08	4.94	17.53	23.60	445
Desired	5.50	7.66	15.30	0.96	22.73	47.85	418

*Percent of companies responding in this category.

In the items regarding trade preparation of sales personnel, there was 27.53 percent of the 385 reporting companies that indicated sales personnel were without formal trade training at the time of the study. Twenty percent indicated having sales people with training at the college non degree level.

As shown in table 52 following, the trend for training desired of sales personnel was toward the direction of college non degree and college degree formal training. The large companies were the predominant respondents with a desire for sales personnel trained at the college degree level.

Table 52

Comparison of the Present and Desired
Formal Trade Training for
Sales Personnel

All Companies	Trade Training None	High school	Post high school	Mili-tary	College non degree	College degree	N=
Present	*27.53	18.18	17.92	2.60	20.00	13.77	385
Desired	4.62	10.26	23.33	1.28	28.72	31.79	390

*Percent of companies responding in this category.

Table 53

Comparison of the Present and Desired
Formal Trade Training for
Skilled Occupations

All Companies	Trade Training None	High school	Post high school	Mili-tary	College non degree	College degree	N=
Present	*21.84	46.44	17.24	6.66	5.98	1.84	435
Desired	3.02	34.11	45.01	2.32	11.60	3.94	390

*Percent of companies responding in this category.

As shown in table 53 above, 46.44 percent of the 435 reporting companies indicated that skilled workers were high school graduates. Larger companies showed a greater percentage in this category than smaller companies.

The trend for future employees was toward a desire for formal trade training at the post high school level. It was noted that almost fifty percent of the largest companies were in this category. Training at the high school level was the next highest desired training level.

Over fifty percent of the 408 respondents indicated that unskilled persons had trade training at the high school level, while over forty percent reported no training of this type.

With regard to the trade training of future unskilled employees, 66.01 percent of 409 companies, reported a desire for training at the high school level. It should be noted that with an increase in company size, there was a corresponding increase in the percentage of response in this category. The data for the present and desired trade training of unskilled employees is shown in table 54 which follows.

Table 54

Comparison of the Present and Desired
Formal Trade Training for
Unskilled Occupations

	Trade Training						
All Companies	None	High school	Post high school	Military	College non degree	College degree	N=
Present	*42.16	50.49	5.15	1.72	0.24	0.24	408
Desired	11.25	66.02	16.87	2.44	2.69	0.73	409

*Percent of companies responding in this category.

An additional comment might be made in regard to all data reported for the various levels of graphic arts personnel. It was noted by the researchers during the follow-up interviews, that some representatives of industry were unsure of the term "trade training." The amount of trade training for employees at the time the study was made, might also be open to question in particular, the unskilled occupations. Due to the limited amount of trade training available, where did those employees obtain the training that was reported? Also, is there a possibility that the respondents to the long form considered the items under the formal trade training category as an extension to the items on educational backgrounds? It was concluded that the formal trade training desired was probably considerably more valid than that reported on the present level.

Public Relations

An item was included on the long form regarding the public relations function. Respondents indicated whether or not this was identified as a separate task. Of the 476 who completed the item, 162 or thirty-four percent indicated that public relations was specifically identified as a task in itself. Those who indicated having this function specifically identified were then asked to check the person or persons, if more than one, responsible for this work. The responses to this question are shown in table 55 following.

Table 55

People Responsible for Public Relations

Person	Number	Percent
Owner	114	70.37
Management Personnel	95	58.64
Sales Personnel	41	25.31
Public Relations Director	23	14.20

A total of the percent column reveals that in many cases this function was assigned to two or more individuals. The categories were in no way mutually exclusive since owners, in cases of companies of most sizes, were also managers and often sales personnel. The predominance of small shops requires this. It would appear that public relations was not a major formalized activity with the exception of some of the larger shops. Almost fifty percent of the shops with fifty or more employees indicated that public relations work was a formalized activity. This was significantly more than all other sizes of shops.

Shortages of Employees

In order to better plan for employee needs and serve the industry, it was of interest to learn the production areas in which the industry was experiencing the greatest shortage of qualified personnel. Table 56 reveals the extent to which companies experienced this shortage in six major areas. An examination of table 56 reveals that the area of greatest shortage was the pressroom, ranked first by 159 or 38.13 percent of the respondents. This was ranked first, second or third by 329, or 78.90 percent which was considerably higher than any of the other areas. The area of second greatest shortage was layout and design which 139 or 33.33 percent ranked as the area of greatest shortage. Sixty-eight percent ranked it in the top three critical shortage areas. Ranked with the third most frequency was composition-imposition. Photography was ranked in the top three labor shortage areas by 53.72 percent of the respondents. Plates and bindery were found to be in far less demand. When data regarding the three areas of greatest qualified personnel shortage were examined in groups based upon company size, it was found that companies of five to forty-nine employees varied only slightly from the overall responses. However, the smallest companies, those having less than five employees, and the largest companies, over fifty, did vary considerably in some areas. Table 57 reveals the nature and extent of these variations.

Table 56

Shortages of Qualified Personnel
by Departments

	Extent of Shortage by Rank				
Department	First	Second	Third	Total N	Total Percent
Layout and design	*33.33	23.50	11.51	285	68.35
Composition and imposition	24.46	25.90	16.07	277	66.43
Photographic	13.43	23.50	16.79	224	53.72
Printing plates	2.16	5.28	5.52	54	12.95
Pressroom	38.13	25.18	15.59	329	78.90
Bindery	4.08	6.47	8.83	81	19.42
TOTAL	....	....	....	417	....

*Percent of all respondents to the item.

Whereas the pressroom was the area of greatest shortage for all companies, small companies ranked the composition-imposition area most frequently and layout and design next. Press was third in frequency reported by the samll companies. Companies with over fifty employees experienced their greatest needs by far in the area of qualified pressroom workers with half of them ranking this area first. Eighty-four percent placed it in the top three shortage area compared with seventy-three percent of the small companies. Throughout the data describing shortages of qualified personnel, it was found that bindery and platemaking workers were not in particularly short supply. This was supported also by the findings in the interviews where representatives generally agreed that such jobs were the easiest to fill, mainly becuase they required a minimum of training in comparison with other jobs.

Non Technical Interview Responses Concerned With Personnel Preparation

The interview portion of the study included a separate series of questions relating directly to the educational aspects of graphic arts manpower developments.

Table 57

Extent of Qualified Labor Shortage by Rank
for Small and Large Companies

Department	Small Companies Less Than Five Employees				Large Companies Over Fifty Employees			
	First	Second	Third	Total	First	Second	Third	Total
Layout and design	*38.96	31.17	9.09	79.22	**22.08	18.18	12.99	53.25
Composition - imposition	32.47	37.66	10.39	80.52	22.08	18.18	16.88	57.14
Photography	10.39	23.38	23.38	57.14	19.48	20.78	18.18	58.44
Plates	1.30	5.19	3.90	10.39	5.19	7.79	6.49	19.48
Pressroom	28.57	29.87	14.29	72.73	50.65	22.08	11.69	84.42
Bindery	3.90	1.30	6.49	11.69	6.49	9.09	12.99	28.57

*Percent of small companies responding.
**Percent of large companies responding.

Industry Assistance. The first question in this series was: "In what ways could or would your company help the schools to develop better educational programs?" In order to expedite the interview, examples were given including such things as hosting field trips, and donating equipment. The responses to this item are shown below.

Company Help Available to Schools

Frequency	
43	Field trips through company facilities
36	Company representatives available to talk
35	Cooperative work experience programs
30	Summer work for students
20	Donations of equipment
19	Donations of surplus supplies (mainly paper and ink)
9	Management participation on advisory boards (including selecting teachers and monitoring instruction)
4	Part time work during school year
1	Familiarize students with production problems
1	Provide part time instruction
1	Help with linotype maintenance
1	Give demonstrations on specialized equipment
1	Process zincs from student negatives

The relatively high response indicating a willingness to help in several ways reflected a generally cooperative attitude on the part of company representatives. Most companies had not been approached for such assistance in the past and the idea of being able to help in some of the above ways had never come up before.

Some problems with aid to schools were also discovered. While only one company representative plainly said that his company would not help in any way and one would not be able to have plant tours, the problem of insufficient volume in summer was mentioned by several as a deterrent to providing jobs for students in the summer time. Small companies particularly reported that jobs were simply not easy to create. Employers were not eager to train someone for a short period of time, although if the student would continue part time in the school year the employer frequently became more receptive to the idea. Two companies reported complexities in hiring stduents due to union requirements and one due to the fact that a loss of production due to inexperience could not be absorbed.

Production Printing by School Classes. The use of school graphic communications classes for doing production printing is a common practice. The most common situation is where the school district printing needs are used for classwork. The other type of printing sometimes done is for community organizations or businesses, essentially commercial printing. The practice of using students in classes to meet printing production needs has long been a point of debate. The question asked in the interview was: "What is your opinion regarding production printing by school graphic arts classes?" The list below reveals the responses to this question.

Industry Opinions Regarding Production
Printing by Students

Frequency	Opinion
17	Opposed to production
14	School printing alright
13	Oppose any competition with local printers
10	Students need varied experiences from specific instructional assignments
7	Production in school produces unsatisfactory trainees
4	Production is good because student sees actual problems
3	Production printing has negative effect on student attitude, they do not want to go into printing
1	Schools should take jobs and do them for the printers who will sell to customer
1	Students need practical experience, but more than form type work

When first asked this question many of those interviewed thought only of the competitive aspect, namely losing company business to school shops. Thirteen objected to production by schools for this reason. While many more considered this factor they expressed the view that the little bit of work taken, and the type of work capable of being done by the classes would not adversely affect their business. It was agreed that the fast print and smallest shops would be greatly affected when located near one of the production classes.

Seventeen of the fifty-nine people interviewed were against production work by classes. Among the most common reasons were:

1. Printing would be predominately school type work, that is administrative forms, letters, and manuals.

2. There would not be the range of experiences needed by the student to advance in skill and knowledge during the course.

3. There would be deadlines on printing which would take procedence over teaching and learning.

4. The course would cover only that which was required for the production, thus omitting many of those areas reported to be important earlier in the interview.

5. Students in this type of course become specialists capable of doing one operation well, but knowing little, if anything, about the other production areas.

The above positions against production work have been reflected already by some teachers in the Carolinas involved with production work. They are not unanimous, however, in these opinions.

The list preceding includes other opinions which reveal immediately the lack of consensus on this topic. The interviews appeared to find more disadvantages than advantages, although the emphasis on doing a range of meaningful jobs prevailed, whether the jobs were production in nature or instructional. The industry made it clear that people were needed who had gained hands-on experience, rather than merely book assignments. The experiences needed to include a range of problem solving situations common to industrial work. How they gained these experiences was not the most important question prior to this one, thirty-five of the fifty-nine company representatives indicated a willingness to participate in cooperative employment programs as one means to this end.

Personal Traits Desired by Industry. Of interest and importance to graphic communications instructional programs are the personal traits considered important by the employers. When asked, "What personal traits do you look for in new employees?" the following list of responses were received.

Desired Personal Traits

Frequency	Personal traits
35	Wants to work, enthusiasm, wants to learn, good worker, attitude to get the job done
22	Neatness, cleanliness, appearance
10	Gets along with others
9	Dependable, diligence, reliable, loyal
7	Attendance, promptness
7	More interest in learning than earning, pride in work
6	No long hair
5	Questioning mind, progressive minded, alertness
5	Honesty
4	Integrity, morality
4	Initiative, willingness to do a little extra
4	Ambition, career or job goals
3	Accept supervision
3	Genuine desire to be in graphic arts
3	Self confidence
3	Maturity, emotional stability, indicated by school grades
2	Manners
2	Ability to complete application form
1	Out of the military service
1	Not color blind, mechanical aptitude

Examination of the above list reveals the importance placed upon attitude. The industry wanted people who were interested in graphic arts over other types of industries. Willingness to learn was considered essential due to the revolutionary changes taking place. Personal grooming was mentioned with second greatest frequency and not to mean length of hair. With the exception of six who clearly wanted no long hair employees, most of those appeared to have accepted long hair as long as it was kept neat. It was frequently mentioned that long hair had been discouraged in in the past.

Such things as working well with others, sharing an interest in the work, and a desire to learn, and pitching in to get the job done dominated the interviews as a whole. The companies had employed too many people just wanting jobs in the past and were strongly desirous of applicants sincerely wanting to make a career of graphic arts. Seven representatives specifically expressed an interest in employees who were more interested in learning than in earning, which was taken to mean that they desired employees who saw the job to be done first and recognized the fact that money would come as skill and knowledge were developed. A separate item was devoted to wages of trainees specifically.

Starting Wage of Graphic Communication Graduates. The question asked next was: "Will a graduate of a high school vocational graphic arts course start at a wage higher than a person with no experience off the street?" To this question forty of the fifty-nine interviewed indicated that he would, but with qualification. He or she would start at higher wages if work could be shown to indicate a level of progress achieved or if the employer knew that the course was substantial and had confidence in it. If the evidence was not there, or the courses was unknown or known to be weak, then no wage advantage would be realized by the applicant.

Thirteen indicated that no wage advantage would be given when a former student started work. Most, however, indicated that if his background was strong that raises in pay would come much faster than for workers without training. Three reported that union contracts would prohibit starting the graduates of a vocational program at a higher wage than others.

When asked if a portfolio of work done during his couse would be of help to the employer, the response was very favorable. It was felt that such concrete evidence would aid in any decision on pay rate, as well as inform the industry of the nature of the work being done. It was felt that this had to be the students own work and not merely jobs printed by the class.

Problems Experienced With Employees Fresh Out of High School. In order to improve the jobs being done in the schools, it was felt that information on the students employed in the past would be helpful. This question was directed toward any high school graduate and not only those from courses in graphic communications since there were very few of them found. The question asked was: "What are the major problems you encounter when you hire kids right out of high school?"

Problems Experienced With New Employees

Frequency	Problems
17	Lack of willingness to work
15	Unsettled, unstable, immature
6	Undependable, unreliable, unresponsible
5	Not interested in learning
4	No self discipline
4	Impatient to make money

3	Military service waiting
3	Acceptance of supervision
3	Attendance
2	Too much talking
2	Not knowing how to work
2	No initiative
1	Ignore details, poor quality work
1	Not taking time seriously
1	Lack of knowledge of basic company operations and efficiency
1	Lack of basic education
1	Lack of goals and objectives

The lack of willingness to work was reported as the most common problem with general immaturity being the second most frequently mentioned. The idea that the employee had to pay his way was found to be apparently new in too many cases. The lack of maturity was recognized by many as characteristics of the age level itself, however. Many of the other problems were thought to be things on which the schools could work. Of possible surprise was the lack of indication that attendance as a problem. Only three indicated having had this experience with young employees.

General Recommendations. The last item on the interview schedule requested any general recommendations that the company representative might have had which were overlooked in the other items. Representative responses to the question are listed below. These items provide somewhat of an overview of opinions. It was felt by the investigators that most of these general recommendations would be agreeable to the majority of the industry.

General Recommendations

Frequency	Recommendations
5	Teach general theory of printing and what production is
5	Get the companies involved with the school programs
4	Need a good background vourse in the industry, the broad ideas
4	Visit plants and discuss what has been seen in actual practice
4	Teach why business exists, sales, accounting, quality control
3	Teach estimating
2	Emphasize good work habits
2	Get involved with business judgments, problem solving in industry
2	Bring teaching methods up to date
2	Relate the programs directly to industry throughout the course
2	See that the students become involved with the work rather than only being observers

2	Do more teaching and less production
1	Reemphasize basic math, especially fractions
1	Get good qualified instructors, need to teach more than machine operators
1	Give more guidance information
1	Use on-the-job training to support the students strongest interests
1	Teach process color
1	Teach students how ink and paper are made
1	Be sure to give the students experience on variety of presses, not one brand only
1	Give students production type deadlines
1	Be sure students know that they will have to continue to learn on the job
1	Teachers need to have experience in trade
1	Build the course into the rest of the curriculum
1	Kids think they are experts when they graduate
1	Do away with hand set type

In reviewing the recommendations, the single trend was that representatives had a broad based program in mind for the vocational student. He should be aware of the overall goals of a company and the varied nature of its work and equipment. He should be much more than a mere operation; knowing what quality is, and having first hand experience in broad areas, rather than of a limited nature. A close involvement and cooperation with the industry appeared to be important to the representatives in bringing about the other recommendations. And finally, the importance of learning on a continuing basis was felt to be fundamental to success on the job. Knowing, as well as doing, was basic to responses throughout the interview phase of the study.

CHAPTER VI

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

At the time of this study, vocational graphic communications courses had been established in North Carolina, South Carolina, and Georgia and plans were in progress for more such programs. This study was undertaken based on the premise that a program of a technical nature dealing with occupations in a modern industry must be soundly founded on the current technology and practices of that industry. Its major intent was to provide information for curriculum planners regarding the state of the art and the opinions and needs of the people who manage the industry.

More specifically the study attempted to answer the following questions:

1. What technical knowledge is needed by employees in production positions in the graphic arts?
2. What technical knowledge is needed by employees in sales and management positions in the graphic arts?
3. What skills and knowledge are desired of production personnel in the graphic arts?
4. What types of equipment are used now, and what types can we expect to see added in the immediate future?
5. What skills and knowledge are desired of sales and management personnel?
6. What production processes are presently utilized in graphic arts plants of given sizes?
7. What are the sources, qualifications, and backgrounds of labor in graphic arts?
8. What is the geographical distribution of graphic arts industries in the labor market area in terms of types and size of operations?
9. What are the public relations practices, and who performs this function in plants of given sizes?
10. What are the opinions of employers as to the desirability of educational or formal training programs at the (1) nondegree post high school, (2) technical school, (3) high school vocational, and (4) college levels?

The significance of the answers to these questions was their value in providing a valid basis for:

1. estimating the number and location of prevocational, vocational, technical, and college level programs as indicated by the number and size of the graphic arts industries in the North Carolina, South Carolina, and Georgia labor market area.
2. providing a guide to be utilized in graphic arts education indicating types of equipment in various areas of the graphic arts industries.
3. either adjusting or supporting the objectives and purposes of the graphic arts education programs recently established in the region.
4. providing a series of conclusions in written form that will be disseminated to all educators, administrators in the State Department of Labor and Education, and industries interested in graphic arts, as well as leaders on the national level.
5. providing data which will aid in properly directing the educational programs at the college level which will prepare future teachers and industrial leaders.

As with any study of this type, the findings were no more accurate than the responses provided by the industrial representatives. The data were representative only to the extent that those who returned information forms were representative of all, including the non respondents. Questions regarding the representativeness of the respondents were checked by means of follow-up procedures and a chi square (x^2) statistical test, which revealed that the respondents and non respondents were from the same population. This procedure provided evidence to the satisfaction of the investigators, indicating that the finding reported herein were truly descriptive of the industry.

Method of Research

The procedure followed in conducting the study took place over a period of six months following the development of the data gathering instruments. This period began in September 1971 and ended in February of 1972. The first data were obtained by means of a post card form requesting information on size of company, nature of work done, and processes employed. Upon return of this card, respondents were mailed a five page information form, referred to herein as the "long form." This instrument contained items which provided a detailed description of the work being done by respondents, as well as the background of their employees. It further contained items regarding their desires in terms of training for future employees.

To stimulate greater response, two follow-up letters were sent to non respondents to the long form, the second of which contained an additional form for their completion. The Printing Industry of the Carolinas contacted all non respondents to the initial post card survey encouraging their cooperation in the study.

To check the representativeness of the respondents, a ten percent random sample of non respondents was contacted by telephone and through an interview the data were obtained. A x^2 statistical test revealed no difference between these non respondents and the volunteer respondents. It was also found that thirty-nine percent of the non respondents either did not actually do any printing (generally sold printing only), or were out of business. This finding indicated that a much higher return may have actually been obtained than the numbers initially indicated.

Including the follow-up respondents, a total of 882 post cards were returned which was 49.69 percent of the 1775 companies on the final mailing list. The long form was returned by 523 companies or 59.30 percent of those mailed. A five percent personal interview follow-up and a x^2 statistical test revealed no difference between respondents and non respondents to the long form. These follow-up procedures support the data reported herein as being representative of the industry as a whole.

In addition to the procedures already described, a series of fifty nine, one and a half to two hour, personal interviews were conducted with selected representatives of the industry, some of whom were recommended by PICA and the Printing Industry of Georgia, and others chosen by the project director for their interest in graphic communications educational efforts. These interviews dealt with topics involving opinions and direct recommendations which could not feasibly have been obtained by mail.

Summary of the Findings

The industry in the Carolinas and Georgia was found to be composed mainly of small shops with fifty-two percent employing fewer than ten employees. The most common size of shop employed three and the median company size was 8.5. Only fourteen percent had over fifty employees. The most common type of work done, as indicated by sixty-five percent of the respondents, was general commercial printing. The next three most common categories were business forms, fast print services, and in-plant printing. Respondents were allowed to check as many areas as they performed and most did more than one classification. Offset printing was employed by eighty-four percent of the companies and letterpress by sixty-two percent. The screen printing process was used by 5.56 percent and flexography and gravure to a still lesser extent. While letterpress was in use by a large portion of companies, only 10.48 percent used it for over seventy-five percent of their work as compared to 54.23 percent for offset. Twenty-six percent of the companies did all work by offset. A third of the respondents did no letterpress printing as compared with ten percent in offset. Over half of the 882 respondents printed by two or more processes.

Technical Practices by Departments

The majority of data were obtained to gain insight into the current practices, in order to draw conclusions as to skills and knowledge needed by future employees. The following pages describe the major findings revealed by these data.

Layout and Design. Respondents were found to be doing most layout and design in their own shops with only fifteen percent reporting doing none. Seventy-five percent, however, did have some such work done by outside agencies and eighty-five percent reported that customers provided some of this work. Over fifty percent indicated that customers provided designs and agency work made up less than twenty percent of their production.

It was found that camera ready copy was done to some extent by nearly ninety percent of the respondents with 28.92 percent doing over eighty percent of it themselves. Camera ready copy was provided by agencies or by the customer quite commonly, although it made up only a small portion of the total volume in most cases. Only about four percent of the companies indicated that the prepared copy was their primary source, used for over eighty percent of their work. This portion of the study clearly indicated that companies were extensively engaged in both layout and design, and finished copy preparation operations while, at the same time, revealing that much outside work was being done by nonprinting organizations not included in this investigation.

The interview phase of the study revealed that the creative person and the person capable of neat and accurate work was in very high demand. This was indicated as one of the biggest problem areas since the work so greatly affected that of other departments. For this reasons, it was found that people working in this department needed to have a rather broad understanding of the overall reproduction process. Data from the long form indicated that this was the second greatest shortage area in terms of the needs for qualified personnel. Two qualifications or backgrounds were found to be essential to personnel in the preparation and planning phases of work. First, a basic drafting background enabling one to measure accurately and neatly for layout of parallel and perpendicular lines, and second, an ability to work arithmetically with numbers, especially fractions, were repeatedly reported as necessary and having been the major cause of problems for the company. Due to the extreme shortage of qualified pasteup artists, several companies had employed people with a general drafting background and experienced good results.

The experiences recommended most frequently for students were preparation of layouts, learn the entire reproduction process, produce clean straight pasteups, do drafting and measuring operations, work on assignments to gain a design sense for such elements as balance and harmony.

New developments were not found to be of major concern in the preparation area. The only development found to be having a major impact was photo composition which require new solutions to problems which arise.

Composition and Imposition. With the volume of literature in the trade devoted to the revolution in cold composition, mainly photo composition, and the decline of hot metal, the data describing their use in the region studied was of particular interest. A perusal of the data quickly revealed that more companies used some form of cold composition, 48.41 percent, than hot methods, which were found to be used by 42.06 percent. This general finding was characteristic of companies in all categories except those of more than fifty employees. Fifty-four percent of the respondents in that category were using metal type. Metal type was broken down into hand set, manual line casting machines, and tape operated line casters. Hand set type was found to be in use by nearly seventy percent of the respondents, although its use amounted to less than twenty percent of the time in the majority of cases. Only fifteen percent reported its use for over twenty percent of their work. Manual line casting machines were used by nearly sixty percent of those responding and tape operated machines by only fourteen percent. The latter two statistics may have been somewhat higher due to a decreased response to the items. It should also be noted that 13.57 percent of the repondents to the long form set no type at all.

Cold composition was examined in terms of major categories. These were manual strike-on, tape operated strike-on, manual photgraphic, tape operated photographic and preprinted type. The most commonly used was manual photo composition which included display size type setters. These were used by fifty-seven percent for a small volume of work. Manual strike-on systems were in use by forty-seven percent with twelve percent doing over eighty percent of their work in this manner. Tape operated photo composition was in use by nearly thirty percent of the respondents with twelve percent reporting its use for over eighty percent of the work. Twenty percent reported that over half their work was set this way. The larger the company, the more use of tape controlled photo composition.

Preprinted type was found to be used by 54.60 percent of the respondents, although in the great majority of cases, it amounted to a very small portion of the total volume.

When data were examined on the use of repro proofs, it was found that twenty-four percent of those who responded made no use of this procedure for obtaining camera copy. Only twenty percent of all respondents used repros for more than half their work. The large shops used this procedure more than others with over thirty percent using it for more than half of the work. Of the shops doing over seventy-five percent of their production by offset, twenty percent were using repro proofs over half of the time.

Imposition Procedures Currently Used. Procedures used to achieve imposition varied widely. The most common was the preparation for imposition at the pasteup stage with seventy percent doing this to some extent. This operation was done somewhat less extensively at the stripping stage by sixty-two percent of the respondents. Fifty-five percent performed imposition using metal forms. For offset printers, the procedure was found to be clearly more common during pasteup.

The interviews revealed the importance of good English, spelling, and rules of punctuation for individuals working in composition jobs. Layout and design sense and an eye for appealing spacing were also found to be among the most needed attributes in this area. Other technical knowledge recommended included copyfitting methods, principle of typography, hot type procedures and principles of photography. The most common problems were spelling errors along with improper hyphenation and punctuation. Communication breakdowns were reported to be a problem in this and other deparments frequently. This reflected a lack of ability to follow the layouts or improper marking of layouts.

Among the experiences recommended for preparation of students in composition, the most frequently suggested was basic hands-on experiences with basic metal composition and lockup procedures. Practice with strike-on composition was mentioned with second greatest frequency. It was consistently concurred that, while some first hand experience with letterpress preparation was important, the student should not spend a large amount of time in its practice. What may have been reflected in these interviews was a backlash caused by the recent development of new programs ignoring entirely the existence of the letterpress process. This factor was mentioned on several occasions. The majority of manpower needs were clearly indicated to be in the newer cold composition and makeup procedures. The interview clearly revealed the extent to which photo composition was on the minds of company representatives. Only one person did not mention this as a major item to have an impact on the work in composition in the near future.

Photographic Department. Seventy-five percent of the respondents to the long form did photographic work of some type. Of this group, more than sixty-five percent were involved in some work with continuous tone photography. Line photography was by far the most common photographic operation with over ninety-five percent doing it to some extent. Line photography represented more than half the work for approximately seventy percent of the respondents. Eighty-seven percent were doing some halftone photography using contact screens with fifty percent indicating this to be a major segment of the photographic work. Only twenty-three percent indicated ever using glass screens and half of these used the procedure very little. Contacting was an operation used by over eighty percent of the companies and twenty-four percent used it over eighty percent of the time. More than half of the respondents used veloxes to a very limited extent.

An interesting finding was that only thirty-four percent used a densitometer for halftone work. Eighteen percent, however, used this instrument over eighty percent of the time. The larger the company, the more extensive the use of densitometers. The production of multicolor special effects was reported to a limited extent by sixty percent of the respondents with the largest shops using such techniques far more than smaller companies.

Operations having to do with process color photography were found to be considerably less common than the preceding items. The most common such operation was the production of screened positives reported as being done by over half of the respondents. Indirect and direct screen color separation, and dot etching were only done by sixteen percent of the respondents and generally not to any great extent.

When data were examined descriptive of the photographic processing method in use at the time of the study, it was found that seventy-five percent still employed tray processing with more than fifty percent using this procedure over eighty percent of the time. Forty-three percent of the largest companies, however, never used this method. Automatic film processors were used by only 33.16 percent, although those using them did nearly all their work in that way. Stabilization processing was used by only thirty-one percent of the respondents and its use accounted for far less of the total work than either of the other two methods.

Photographic Department Interview Information. The industry representatives interviewed reported that the lack of technical knowledge was the most common problem related to the personnel in the photographic area. This, along with an inability to make consistently high quality line and halftone negatives, was the greatest concern in most cases. These two problems were directly related and it was felt that if the schools could improve on this situation by providing applicants for jobs who had a sound knowledge and some first hand experience in line and halftone work, a great service would have been rendered. The technical knowledge had become more essential, not only due to new techniques in use, but also due to the increased use of processors which remove the freedom to inspect the negatives and make adjustments as is done in tray processing.

Among the new developments found to be causing changes in the nature of the photographic work, automatic processors, new materials, and more automatic cameras with sophisticated exposure systems were mentioned most often. Their impact was clearly in the directions of increased knowledge needed by employees to fully utilize the new developments.

Stripping. Line stripping was clearly the most common operation in this area, followed by multicolor and process color work. Fifty-seven percent reported that line stripping accounted for more than eighty percent of the work, as compared to nineteen percent for process color work. All three operations were of major importance with process color stripping being done to some extent by sixty percent of the respondents. Companies of different types, for example, package printers or trade services, used various stripping operations to greatly differing extents. Thirty-nine percent of the largest companies did process color stripping over half of the time, while eighty percent of the shops with one to four employees reported doing none.

Stripping Interview Information. The most often mentioned technical knowledge needed by strippers was a thorough understanding of the press, its capabilities, and its built-in limitations, such as plate clamping area, gripper margins and printing limits. A knowledge of multicolor, process color and the use of pins for stripping was mentioned with second most frequency. Among the many other items mentioned, planning the layout for page imposition was considered to be very important.

This area was one of the most demanding in terms of the ability of the employee and in shortest supply of manpower. It was generally agreed that a good stripper had to know a great deal about the entire job to do his work well. The major problems encountered in this area came mainly under the description of careless, sloppy practices.

The representatives interviewed recommended general light table work including jobs in difficulty up through multicolor stripping, including preparation of combinations. It was generally agreed that actual work with duotones and observing demonstrations of process color stripping would be sufficient. Due to the fact that strippers were often the cameramen, it was considered important for trainees in this area to be well grounded in camera work as well.

Letterpress Printing Plates. While printing directly from hand set type was done by over eighty percent of the respondents who did letterpress work, only ten percent reported that this made up over half of their work. Printing from hand set type was done by companies of all sizes and types, but almost always to a limited extent. Of the respondents doing letterpress printing, eighty-seven percent printed to some extent directly from linotype slugs and over forty-five percent did so more than half the time. Stereotypes were in use by only thirty-one percent with the daily newspapers found to be the only category of major users. Zinc plates were used by sixty percent of the letterpress printers, but for forty percent this amounted to less than one-fifth of the volume. Only thwenty-three respondents were using photo-polymer plates.

Offset Printing Plates. Of the six types of offset plates listed on the long form, presensitized plates were by far the most used with ninety-four percent using them, and 53.50 percent for more than eighty percent of their work. The next most used plate was the direct photo plate used by forty-nine percent of the respondents. The extent of use of this type of plate was widely varied with only 13.44 percent doing eighty percent or more of the work in this way. Direct image masters were used by forty-eight percent of the respondents, however, the extent of this use was very minimal. Wipe-on plates were in use by thirty-nine percent of the companies with twenty percent doing more than eighty percent of their work in this way. Deep etch plates were used by only 16.67 percent of the 282 who responded to that item, and dry offset plates were used by ten percent fewer.

Interviews on Platemaking. The major interest in the interviews centered on offset plates and generally the opinion was expressed that platemakers were among the easiest to train relative to other jobs in a plant. It was considered important that trainees understand what was actually being done as a plate was processed in order to avoid the problems which appear later due to errors at this stage. Types of plates and their uses were recommended background knowledge and proper procedures for simple and multiple exposures were reported to be important. As in stripping, the major problems in this area arose from sloppy work habits. It was apparent that workers needed to develop an appreciation for the materials and their care before the most common problems could be cured.

The only new development reported with great frequency was the increased availability of plate processors. The impact of which would be clearly an increase in productivity and uniformity with less skill demanded of the platemaker.

Gravure and Flexographic Printing Plates. Nine respondents to the long form did rotogravure printing, five of them over eighty percent of the time. Engraved plates were used by a total of five respondents. Flexographic printing was done by 2.21 percent of the 882 post card respondents. Twenty-four companies responding to the long form did some flexographic work with sixteen doing this more than eighty percent of the time. Seven of these sixteen were package printers.

Screen Printing Plates. Forty-nine or 5.56 percent of the post card respondents did screen printing. A variety of types and sizes of companies did some screen printing, although the extent was generally limited. Photographic transfer stencils were the most used, with hand cut film second. Direct emulsion was used by fifteen screen printers. The two photographic stencil processes were used to produce the greatest volume of work.

Presswork. There were sixteen items presented the respondent regarding presswork. The first four attempted to categorize the company's work into levels of complexity. Ninety-eight percent of the respondents did single color line work with approximately sixty-five percent doing over half of their work in this category. Ninety-six percent were doing single color printing involving halftones with twenty three percent reporting this to be over half of their work. Work involving two or more colors in registry was done by over ninety-five percent of the respondents. Twenty-three percent indicated that over half of their work was in this category. Sixty percent did process color printing, although only 11.46 percent reported this as more than half of their volume. All of the above were clearly major operations. The larger the company, the more extensive was the production in the more complex levels and the less the work in the simple operations. Over eighty percent of the shops with one to four employees did no process color printing. The remaining items in the presswork section of the long form dealt with specific operation in use. In these items it was observed that sixty-two percent were checking the offset fountain for pH with nearly one fourth doing this most of the time. Densitometers were in use for quality control on the press by twenty-eight percent of the respondents with the majority of these being companies of over twenty employees.

The use of offset spray powder was very common with larger companies making extensive use of it. It was found that molleton dampening systems were in more common use than non-molleton systems. Whereas eighty percent used molleton type rollers, only forty-six percent were using the other systems. Companies with over fifty employees used the non-molleton systems considerably more than others.

Numbering, perforating and die-cutting were used to varying extents by over half of all respondents with little difference noticed between companies of different sizes. Embossing was done by twenty percent and slitting by thirty-six percent of the respondents. Thirty percent reported printing on non paper substrates, although this practice was used for a minumum amount of the work in most cases. Fourteen percent of the respondents did sheeting of roll stock.

Presswork Interview Responses. When asked to identify elements of technical knowledge needed by employees doing presswork, an understanding of paper and ink was the most common item mentioned. A knowledge of lithographic chemistry, ink and water balance, alcohol dampening systems and pH was desired by a large number of the representatives interviewed. A high mechanical aptitude for a pressman was considered an essential qualification. Also reported often was an ability to mix inks by matching systems as well as selecting inks for certain jobs. This along with stripping was one of the most demanding areas in terms of knowledge needed.

Problems encountered in the pressroom were mainly identified as lack of consistency often related to poor control of ink and water balance on lithographic presses. Waste and carelessness were also major trouble areas.

The experiences recommended most for students learning presswork included a need for hands-on experience on presses as well as duplicators, and handling and preparing ink and paper for the press. A number of other experiences were identified with less frequency. New developments thought to have a likely effect on presswork in the future included new dampening systems and plates, better papers, the influx of "driographic" printing and more automation in the form of push button controls on presses.

The press area was indicated in the long form to be the area of most critical need for qualified personnel. There was strong evidence to indicate that pressmen were in short supply who actually understood their work as opposed to simply being "lever pullers."

Bindery and Finishing. Forty-two percent of the respondents to the post card survey reported doing bindery work to some extent. Of the respondents to the long form, only sixteen percent reported doing no work in bindery and finishing. Mechanical binding was done by fifty-seven percent of the respondents, although the extent was generally limited. Only twenty-seven percent did any hard binding of books by hand and this too was only to a limited extent. Less than seven percent were doing casebinding with the aid of machines; twenty-four percent did, however, make covers for books. Sixteen percent of the 280 respondents to the item did perfect binding. This too was an operation in limited use.

The ten most frequently reported finishing operations in order of their extent of use were trimming, folding, padding, collating, drilling, perforating, gathering, punching, numbering, and glueing. The above operations were each reported as being performed by over half of the respondents. Die-cutting and tipping were used by 46.24 and 43.28 percent of the respondents respectively.

Bindery and Finishing Interview Responses. The most important knowledge required of personnel in the bindery was a knowledge of paper and its characteristics. Mentioned with the next greatest frequency was the importance of a high mechanical aptitude. The next most often mentioned item, followed by a long list of specifics, was an overall understanding of printing and finishing procedures.

Problems experienced most often were said to be general carelessness and improper setups. Credit was also given to poor communcations as a cause of many difficulties found in the bindery.

Experience in a variety of bindery operations, including folding, cutting, side and saddle stitching were recommended for students desiring a background in bindery work. It was generally agreed, however, that much less emphasis should be placed on activity in the bindery relative to other departments. Company representatives indicated that the machinery was too expensive to buy when the minimal amount of learning it facilitated was taken into consideration. The only developments viewed as having a potential impact on bindery work involved increased speeds and greater automation.

Sources of Labor. In each section of the interview, the company representatives was asked to indicate the primary sources of employees. In all production departments, the most common source was the walk-in applicant off the street without previous experience. Generally, the second most common source was the other shops in the area, a practice disliked strongly by many and reluctantly reported by most. Very few specific references were made to schools as a primary source of help. The two most notable exceptions were the hiring of drafting students from post high school courses for pasteup artists, and the employing of commercial art students from Central Piedmont Community College in Charlotte. These two groups were reported to have worked out well on the job.

Sex of Employees. Items were included in each section of the interview seeking to identify any preferences existing for personnel of one sex or another. The general consensus was that the work of most departments was well suited to either sex. The most notable exception was that women might not be successful on the large presses. Women were frequently preferred in copy preparation and generally in cold composition work. In fact, it was agreed that graduates of typing programs would be preferred for keyboarding composition since speed and especially accuracy were the primary prerequisites. The photographic work was equally well adapted to either sex. A few employers did express some reluctance over employing women generally, simply because they had not ever tried them.

Personnel Preparation. A portion of the long form was devoted to personnel preparation needed for sales and management personnel in graphic arts industries. The overall response revealed that management personnel needed a very broad knowledge of nearly all phases of the graphic reproduction processes, as well as business aspects such as accounting, cost analysis, economics, and other similar areas. When asked their opinions regarding the need for management to have an understanding of the flow of work through the major processes, 96.68 percent considered such a knowledge of offset to be desirable or essential. Letterpress was similarly marked by eighty-three percent. Only forty percent expressed similar opinions regarding screen printing, and still less marked gravure and flexography. Sales personnel were also found to need a knowledge of the processes, although to a lesser degree than management.

The high expectations for management knowledge were clear upon examination of responses to a list of thirteen basic knowledge areas. The majority of the items on the list were considered desirable or essential by approximately ninety percent of the respondents. The "knowledge" items included such things as cost analysis, quality control methods, copy preparation procedures, current typesetting systems, common pressroom problems, accounting, and reproduction photography. It was clear that graphic arts management needed to be well grounded technically as well as being knowledgable about business in general.

Sales personnel were also found to need a broad background, although the importance was somewhat less than for management. Eighty-three percent of the respondents considered a knowledge of design, copy preparation, and typesetting to be "desirable" or "essential". Approximately sixty percent marked the majority of the thirteen items as being "desirable" or "essential" for sales personnel. A knowledge of plates and color separation photography was considered somewhat less important than other items.

Respondents continued to indicate the need for highly qualified sales and management personnel by indicating that actual experiences in the five major production areas were either "desirable" or "essential." Approximately eighty percent of the respondents marked the long form in this way. Although to a lesser extent, the majority also indicated that sales personnel needed such experiences. Planning or design, and copy preparation were consistently found to be the most important for both groups with management needing experience in prepress and presswork equally as much.

Data regarding the present and desired education for management personnel revealed that over fifty-nine percent desired a college degree as compared to forty-one percent whose management had degrees at the time of the study. It was found that approximately fifty-two percent had graduated from high school or gone to some non degree point beyond high school. Only thirty-two percent reported that this level of preparation was desired of future managers.

Forty-seven percent indicated that sales people should be college graudates. Twenty-eight percent reported that their typical sales personnel had college degrees. The trend was clearly toward more education desired for sales and management personnel than was characteristic of present employees.

In response to items on education of skilled employees, it was indicated that 76.17 percent were presently high school graduates, with an additional 17.02 percent having had some post high school education. Forty-seven percent indicated that high school graduates were desired for skilled jobs, with 45.86 percent indicating a preference for skilled workers having post high school credentials. The trend was clearly toward more formal education.

It was found that at the time of the study, 31.05 percent of the companies employed unskilled workers with less than high school diplomas and 64.61 percent with high school completed. In indicating their desires, 74.62 percent preferred high school graduates, while thirteen percent desired applicants with education beyond grade twelve. Eleven percent preferred unskilled employees with less than a high school degree.

The study attempted to ascertain the extent to which graphic arts employees had been formally trained in the graphic arts. It was reported that twenty-three percent of the management had received such preparation at the college degree level. Forty-eight percent indicated that college degree preparation in graphic arts and management was desired for future managers. Another twenty-two percent desired such preparation at the college non degree level. Another 15.30 percent desired post high school preparation of managers.

At the time of the study, the majority of sales personnel either had no graphic arts training or some at the high school level. When the desired preparation was examined, it was found that thirty-one percent desired college preparation and another 28.72 percent college non degree work in graphic arts or related areas.

Skilled employees either had no training or high school level preparation at the time of the study. Forty-five percent of the respondents indicated a desire for training of skilled employees at the post high school level, with another 34.11 percent desiring such preparation in high school. High school programs were desired for unskilled occupations as a rule.

The interviewers found that the idea of formal trade training was not clear in the minds of some company representatives, since they had experienced little contact with such programs. For this reason, it is suggested that data describing the formal level of trade training were probably indicating somewhat more formal training background than was actully the case. Only interviews of employees would clear up this question.

Shortage of Qualified Production Employees. A section of the survey was devoted to a ranking of the three major production areas in which there were the most critical shortages of qualified personnel. The pressroom was ranked in the three most critical areas by 78.90 percent of all respondents, with nearly forty percent ranking it first. Ranked with the second greatest frequency was layout and design. Composition and imposition was ranked next most often.

Shortages varied between large and small companies. Eighty-four percent of the large companies ranked the pressroom in the top three critical departments. Fifty-one percent ranked it first. Shops with over fifty employees ranked the photographic area second, followed next by composition, and then layout and design. Companies with one to four employees indicated that greatest shortages of qualified personnel were in the composition area and layout and design. The pressroom was ranked in the top three areas of manpower shortage with third greatest frequency by small companies. Qualified employees in the bindery and platemaking areas were seldom reported among the three areas of most serious shortage.

Non Technical Interview Items. The interview portion of the study included a separate series of questions relating directly to the educational aspects of graphic arts manpower development. The first item in this section sought to determine ways in which companies could aid the educational programs in the schools. The most common forms of assistance in the order of frequency reported were: opening companies to classes for tours, providing personnel to speak to students, cooperating in work experience programs, and providing summer jobs with preference to graphic communications students. These were felt to be feasable by over half of the representatives interviewed. Twenty indicated a willingness to donate equipment when it was still in condition to be used and had value in terms of teaching current methods. Nineteen indicated that on frequent occasions, supplies were discarded, mainly paper and ink, which would go bad on the shelf if kept. It was considered feasible for schools to pick up such items for use by students. Some companies were already assisting in this way. Other possible assistance included participation on advisory boards, assistance with machine maintenance, providing demonstrations on specialized equipment or of unique operations.

It was found that companies had generally not been approached for assistance and that much help was available for the asking. Attitudes were generally very positive toward cooperative efforts.

There were some definite limitations pointed out in regard to industry assistance. Summer work was considered to be a difficult type of aid for some due to the apparent decrease in volume during summer months. Small companies, it was suggested, would find this a particular problem. There was also a reluctance to train students for a short period of time. When asked whether a student continuing to work part time during the school year would be better, it was generally agreed that such an exception would be strongly preferred.

An item was included for the purpose of ascertaining the opinions of industrialists regarding the use of classes for production print shops. Seventeen representatives were clearly opposed to any use of classes for production work. Fourteen indicated that the practice was satisfactory. Thirteen were only concerned from the standpoint of schools coming into competition with commercial printers for local work. The major problem revealed by ten companies was the students need for work which was varied in nature, and the fact that school production did not allow the instructor to control the variety of work assigned. It was further reported that production actually caused some students to dislike printing, and created negative attitudes in those who pursued the trade.

The interviews revealed more disadvantages than advantages, although the emphasis on doing a range of meaningful jobs prevailed whether the jobs were of a production nature or instructional. It was clear upon completion of the interviews that job applicants were needed who had gained hands-on experience rather than merely book assignments.

The personal interviews included a question on the personal traits desired by employers of new employees. The description best fitting the desires reflected by the majority of the company representatives was one who wants to work, displays enthusiasm, wants and is willing to learn, and whose attitude reflects a desire to get the job done. Neatness and cleanliness were mentioned with the second greatest frequency. Reliability, promptness and a good attendance record in school or work were characteristic of other personal qualities desired of new employees. While "no long hair" was reported by six, several other representatives carefully pointed out that having had some experience with young people and their long hair, they were no longer opposed to this as long as it was reasonably well kept. The overall indication was that applicants demonstrating a desire to work and a positive attitude would be likely to succeed, especially if they came with some kind of credentials showing evidence of training in graphic communications.

During the interviews, a question was asked concerning the starting wage of graduates from high school level vocational graphic arts courses compared with applicants having no experience. Forty of the fifty-nine interviewed said the wage would be higher, however, this response was generally followed by certain qualifications. Wages would be higher if the graduate had samples of his assignments or if the program was known to the employer as being one of quality. Thirteen indicated that no wage advantage would be realized at first, but that a person with evidence of real training would advance quickly compared to one lacking any background.

The only problems mentioned frequently regarding the employment of young people fresh out of school were their lack of willingness to work and the fact that they were immature and unsettled. Seventeen company representatives reported having had this experience. Several other problems were mentioned, however, only by a small number of those interviewed. In this item, only three indicated that attendance had been a problem.

General Recommendations. In addition to the specific questions asked of company representatives, a last opportunity was afforded him to offer general recommendations for consideration by graphic arts educators. While the comments were numerous, the general theme was that schools should teach the general theories of preparation and printing and see that the courses are representative of current industrial practices. Graphic arts programs should join with the industry in cooperative activities including visits to companies and placement of students in cooperative work programs. The nature of the course should be characterized by active practice of the prcedures and processes of industry with concurrent study of the theories which enable the practitioner to make judgements on the job.

Conclusions

To the extent that the responses were valid and representative of the total population studied, the following conclusions seem warranted.

The industry in the Carolinas and Georgia is predominately an offset and letterpress industry with offset the considerably more prevalent process. Based on this finding, the educational programs will serve the industry and the student best if instruction is included in both processes. However, this sould be carefully planned to avoid excessive investments of time and money in letterpress.

The greatest shortage of qualified personnel are in the areas of presswork, layout and design, composition, and photography in that order. Based on this finding, along with the consensus that binding and plate preparation are areas requiring minimal training, it is concluded that courses stressing preparation and presswork will best serve the student, as well as the industry.

Furthermore, since pressmen were in greatest demand and due to the recommendation that schools teach presswork, as well as duplicator operation, it is concluded that educational facilities be equipped with machines including offset duplicators and small presses. With few exceptions, it was agreed that the press did not need to be one of the large models, but rather a machine requiring an operator to learn the controls characteristic of the large presses. Several such small presses are readily available on the market.

Based on the common finding that drafting was good preparation for several of the graphic communications industry areas, it is concluded that a basic course in drafting or mechanical drawing, taken prior to, or concurrently with a course in graphic communcations would be a significant aid in developing the background needed for success in the field.

Due to the frequency with which company representatives associated production problems with communication breakdowns, general carelessness, and laxity in working to tolerances; it is concluded that programs stressing precise adherence to directions, and the highest levels of quality throughout all phases of the course will quickly be recognized as the kind of programs best serving the student and the industry.

While there were cases where narrowly trained specialists were in demand, due to the fact that half the companies employed fewer than nine people and the majority of production areas require employees knowledgeable and skilled in the most common elements of all areas, rather than allowing them to specialize in the high school pre-work state of their careers. Recognizing, however, the need for technically knowledgeable craftsmen and technicians in many areas, particularly in the large companies, it is concluded that post high school institutions will need to implement more specialized courses for employees advancing on the job and for graduates of the high school programs having the ability and displaying the readiness for continued study. This conclusion is further supported by the fact that forty-five percent of the respondents indicated a desire for future employees with post high school trade training.

Implementation of such programs in the post secondary school might be helpful in meeting another demand observed in the data obtained from the long form. Respondents expressed a clear desire for sales and management personnel with college training in the graphic arts. Post high school programs would provide a source of students, having made their occupational choice, for entry on transfer into degree level programs at the four year institutions. Current programs at the college level would require updating and expansion before qualitative demands of the industry could be satisfactorily met.

Based on the observation that industry was for the most part unaware of the educational programs in their region, and furthermore, due to the consistent recommendation that schools and local industries work closely together, it is concluded that instructors and company representatives need to establish contact in order to maximize the benefits from their mutual efforts, namely, the upgrading of the educational programs, and the obtaining of qualified employees for the companies. The attitude among industrial representatives, with only a few exceptions, appeared to be very agreeable in this regard. Due to the pros and cons presented regarding production printing by school classes, it is concluded that the ideal course is one which has a planned series of experiences for the student without the dictates of production. When the instructor can request a production job to fit one of the specified assignments and set the deadline himself without outside pressure, this sort of work would be suited to the instructional program. Due to the fact, however, that production work inherently carries deadlines which are carefully checked and the concurrent fact that seldom are deadlines on learning so carefully checked, it is concluded that any production responsibilities of instructors and classes are a threat to achieving maximum benefits to the student and the industry.

In light of the finding that seventy-five percent of the respondents did photographic work and based on the fact that the most common problems in this area were lack of technical knowledge followed by an inability of cameramen to produce consistent quality line and halftone negatives, it is concluded that a sound instructional unit in reproduction photography, stressing skills in line and halftone work, is needed as an inherent part of the graphic communication course.

Due to the responses of most representatives interviewed regarding the suitability of male and female employees to the work of various production departments, it is concluded that opportunities exist for both men and women in all areas with only one exception. The large size presses might be found best suited to male workers. Cold composition and copy preparation are areas especially well adapted to women. In several cases, women were preferred over men in these two areas.

Recommendations

Due to the fact that only companies directly associated with printing were included in this study, it is recommended that a separate study be undertaken to identify other private and public employers of graphic designers and mechanical artists. This study revealed the existence of sources of copy other than printers, however, it was beyond the scope of the study to seek out and survey the extent and nature of these sources.

Continuous tone photography is another area directly involved with this study, but more commonly associated with an industry of its own. It is recommended that a survey be conducted to describe this industry in the Carolinas and Georgia for the purpose of drawing implications for education.

In light of the interest expressed by industry in becoming more involved in the educational activities, it is recommended that steps be initiated to bring about personal contacts between instructors and the management of graphic communications companies located in the areas surrounding the schools. It is further suggested that the trade associations and clubs of the three respective states would be logical leaders in such an effort.

Upon acceptance of this report by the Office of Education and its review and approval by the Printing Industry of the Carolinas, it is recommended that steps be taken to assure implementation of the findings into the curricula of the respective states. It is recognized that the Department of Education of the state of South Carolina was already embarked on such curriculum development at the time of this writing.

The value of a portfolio of all a student's work was discussed during several of the interviews. The topic arose in regard to the question about wages of graphic communications graduates compared to job applicants having no preparation. Due to the favorable response to the idea of a student portfolio and in light of the finding that wage advantage might not be realized without concrete qualitative evidence of training, it is recommended that a portfolio of assignments completed by each student be kept throughout his course and made available upon request to potential employers. This would be similar to the cumulative file generally used to record the school history of all students.

The last recommendation comes as a result of the personal interviews in which nineteen company representatives expressed a willingness to make excess supplies, mainly paper and ink, available to schools. Such aid would be helpful in removing some of the pressure for production and relieve the students of certain expenses necessary under present conditions. It is, therefore, recommended that procedures be established to pass on excess supplies, periodically cleared from inventories, to the schools in the immediate area. It is further recommended that school authorities provide some means of physically transporting such materials when available to avoid inconvenience to the companies offering this assistance.

The preceding recommendations were made in light of the findings of this study and with the interests of better graphic communications programs in mind. It is evident to the investigator that if the needs of the student are being served so will the interests of the industry. His needs will only be met when he is gainfully employed and achieving success. When this occurs the employer will have begun to realize the benefits of an available source of qualified employees.

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Appendix A

Initial Letter to the Printing Industry

Post Card Survey Accompanying the Initial Letter

Followup Letter to the Post Card Survey
Sent Out by the President of PICA

Initial Letter Accompanying
The Primary Data Instrument - Long Form

Primary Data Instrument - Long Form

First Followup Letter to the Long Form

Second Followup Letter to the Long Form

Letter Accompanying the Long Form
Sent Out After Telephone Followup

Graphic Arts Inventory for Education

P.O. Box 7943
Clemson University
Clemson, South Carolina 29631

Recently, much constructive criticism has been leveled in our trade publications concerning the present status of graphic arts education. It seems that the majority of this criticism is two-fold. Number one is that there are too few graphic arts programs in the schools. Secondly, those programs now in existence are inefficient and the quality of the graduate is definitely lacking.

One possible reason behind these problems is that we, the educators, have not been fully aware of your needs. We are currently involved in the first stage of an in-depth study covering the printing industry in North Carolina, South Carolina and Georgia. The purpose of this study is to determine the steps graphic arts education must take to present you with qualified personnel. But we must have certain vital information concerning the printing industry which only you, the printer, can supply us. All information you give will be held strictly confidential.

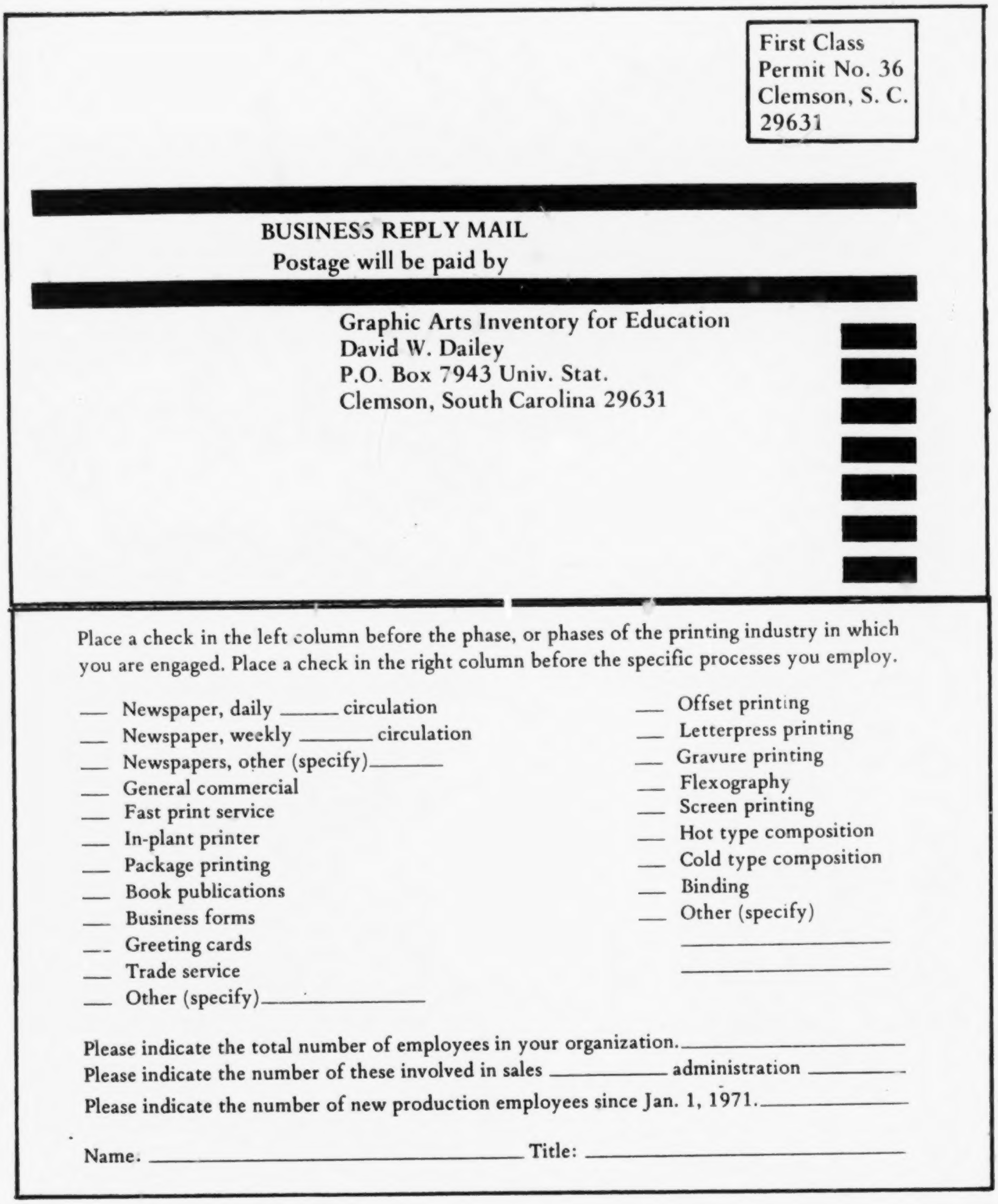
While you have this letter before you, please take just a moment to fill out the enclosed prepaid postal card and return it to us. May I re-emphasize that the quality of future employees educated in the graphic arts depends upon your assistance in this study.

Sincerely yours,

David W. Dailey
Research Coordinator

Help develop better education for better manpower!

Post Card Survey



First Class
Permit No. 36
Clemson, S. C.
29631

BUSINESS REPLY MAIL
Postage will be paid by

Graphic Arts Inventory for Education
David W. Dailey
P.O. Box 7943 Univ. Stat.
Clemson, South Carolina 29631

Place a check in the left column before the phase, or phases of the printing industry in which you are engaged. Place a check in the right column before the specific processes you employ.

___ Newspaper, daily ______ circulation
___ Newspaper, weekly ______ circulation
___ Newspapers, other (specify)______
___ General commercial
___ Fast print service
___ In-plant printer
___ Package printing
___ Book publications
___ Business forms
___ Greeting cards
___ Trade service
___ Other (specify)____________

___ Offset printing
___ Letterpress printing
___ Gravure printing
___ Flexography
___ Screen printing
___ Hot type composition
___ Cold type composition
___ Binding
___ Other (specify)
____
____

Please indicate the total number of employees in your organization.____________
Please indicate the number of these involved in sales ________ administration ________
Please indicate the number of new production employees since Jan. 1, 1971.____________

Name. ____________________ Title: ____________________

PICA

The Printing Industry of the Carolinas, Inc.

BILL TREADAWAY
Executive Secretary

Fellow printers of the Carolinas and Georgia -

Recently you received a letter from "Graphic Arts Inventory for Education", Clemson, S. C. With this letter was a request for your assistance in ascertaining the man power needs of the printers in this area. The records of Clemson University Research Coordinator, David W. Dailey, indicate that we have not received a reply from your firm.

We thought that perhaps if you were aware of the critical need of an adequate response to the questionnaire, you might at this time agree to help by completing the enclosed card.

For some time, printers in our area have complained that they can not find skilled employees. Young people are not selecting the printing industry as their life time vocation in the numbers necessary to keep pace with our industry. Everybody cusses the problem, but until this major undertaking by The Printing Industry of the Carolinas and Clemson University, no one has done anything about it.

Now for the first time, a very extensive research project is under way to find out what the needs of the printing industry are. When we speak of the printing industry, we mean any firm, whether it operates one press of a hundred; a firm with one employee or a thousand. Size doesn't matter, the personnel problem is just as acute for the one man operation as it is for the 200 man plant.

When this survey is completed, the next step will be to undertake an educational project, to write the texts and outline the instruction for high school and technical school students. (Would you believe that there is very little text material for the teaching of printing?)

When the text has been written, and a course outline made, the next step will be to have seminars for the printing teachers in our area. With approved material and proper equipment, the teachers will be better prepared to teach the standards that are required by our printers.

We hope that you now realize the importance of this survey. It must be representative of the smallest to the largest operation. If you have a single press, you are just as important as the man with

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twenty. As the old Chinese proverb says, "the hardest part of a thousand mile journey is that first step." Won't you join over 1,990 other area printers with that first step?

Sincerely yours,

George R. Morgan
President, PICA

Carroll M. Spencer
President, PICA Foundation

Graphic Arts Inventory for Education

P. O. Box 7943
Clemson University
Clemson, South Carolina 29631

Your interest in the current status of education in graphic arts is evident by your response to the first phase of the "Graphic Arts Inventory for Education". It is encouraging to know that printers in our area are interested in the quality of their future employees. From the information provided on the recently returned blue card, we are able to begin taking steps to improve the quality of graphic arts education in North Carolina, South Carolina and Georgia.

In addition to the very general information obtained, it is necessary to know more about the specific processes you are using. This will give a basis upon which to structure new education programs so graduates will not be taught outmoded methods and technology.

We are interested in the plant operations performed in your organization, the desired personnel preparation, and other general information which you can provide. Thus, if you would take just a few minutes out from your busy schedule to complete the enclosed form and slip it into the prepaid envelope, you would greatly aid us in this study. Please answer all questions as per instructions at the beginning of each section. Additional space is provided at the end of each section for other methods or procedures you use and feel are important.

It is vital that you complete this form and return it in order that we may make an accurate appraisal of all phases of the printing industry. We are concerned with the one-man shop as well as the large organizations, specialty shops and in-plant printers.

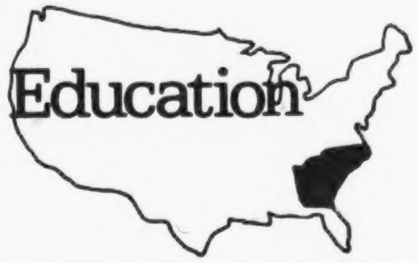
Thank you for your continued interest and valuable assistance in promptly returning the completed form.

Sincerely yours,

J. Page Crouch	David W. Dailey
Project Director	Research Coordinator

Help develop better education for better manpower!

Graphic Arts Inventory for Education



PLANT OPERATIONS PERFORMED

Circle the column indicating the extent to which the following operations are performed in your plant.

LAYOUT AND DESIGN	None	Less than 20%	21% to 50%	51% to 80%	Over 80%
Number of employees who "do work" in this area. ( )					
1. layout and design done by outside agencies	1	2	3	4	5
2. our staff does layout and design for customer	1	2	3	4	5
3. customers furnish complete layouts	1	2	3	4	5
4. camera ready copy prepared by our staff	1	2	3	4	5
5. camera ready copy provided by outside agencies	1	2	3	4	5
6. camera ready copy provided by customer	1	2	3	4	5
7. other (please list and circle appropriate number)					
______________________________	1	2	3	4	5
______________________________	1	2	3	4	5

COMPOSITION AND IMPOSITION If no Composition and Imposition work is done in your plant, circle "1" and go on to Photographic Department.	1				
Number of employees who "do work" in this area. ( )					
In our plant we use:					
1. hand-set type	1	2	3	4	5
2. line casting machines - manual keyboarding	1	2	3	4	5
3. line casting machines - tape operated	1	2	3	4	5
4. strike on composition - manual	1	2	3	4	5
5. strike on composition - tape operated	1	2	3	4	5
6. photo composition - manual	1	2	3	4	5
7. photo composition - tape operated	1	2	3	4	5
8. pre-printed type (artype)	1	2	3	4	5
9. repro proofs for camera copy	1	2	3	4	5
10. hot type for imposition	1	2	3	4	5
11. page imposition performed at the paste-up stage	1	2	3	4	5
12. film stripping for imposition	1	2	3	4	5
13. other (please list and circle appropriate number)					
______________________________	1	2	3	4	5
______________________________	1	2	3	4	5

PHOTOGRAPHIC DEPARTMENT If no photographic work is done in your plant, circle "1" and go on to Printing Plates.	1				
Number of employees who "do work" in this area. ( )					
In our plant we do:					
1. continuous tone photography for halftones	1	2	3	4	5
2. line photography	1	2	3	4	5
3. contacting	1	2	3	4	5

	None	Less than 20%	21% to 50%	51% to 80%	Over 80%
4. halftone photography using glass screen	1	2	3	4	5
5. halftone photography using contact screen	1	2	3	4	5
6. halftones using screened and pasted up dot prints (veloxes)	1	2	3	4	5
7. multiple color special effects (duotones, posterizations, etc.)	1	2	3	4	5
8. screened positives	1	2	3	4	5
9. direct screen color separation	1	2	3	4	5
10. indirect screen color separation	1	2	3	4	5
11. tray processing	1	2	3	4	5
12. stabilization processing	1	2	3	4	5
13. automatic film processing	1	2	3	4	5
14. dot etching	1	2	3	4	5
15. densitometer readings on halftone work	1	2	3	4	5
16. simple line stripping and masking	1	2	3	4	5
17. multicolor stripping and masking	1	2	3	4	5
18. process color stripping and masking	1	2	3	4	5
19. other (please list and circle appropriate number)					
______________________	1	2	3	4	5
______________________	1	2	3	4	5

PRINTING PLATES

Number of employees who "do work" in this area. (   )

In our plant we PRINT FROM:

Letterpress Circle "1" if you do not use Letterpress.	1				
1. hand-set type	1	2	3	4	5
2. Linotype and/or Intertype slugs	1	2	3	4	5
3. stereotype plates	1	2	3	4	5
4. zinc plates (or copper)	1	2	3	4	5
5. photo-polymer plates	1	2	3	4	5
6. other (please list and circle appropriate number)					
______________________	1	2	3	4	5
Offset Circle "1" if you do not use Offset.	1				
1. direct-image masters	1	2	3	4	5
2. photo-direct plates	1	2	3	4	5
3. presensitized plates	1	2	3	4	5
4. wipe-on plates	1	2	3	4	5
5. deep-etch plates	1	2	3	4	5
6. letterset (dry offset) plates	1	2	3	4	5
7. other (please list and circle appropriate number)					
______________________	1	2	3	4	5
Gravure Circle "1" if you do not use Gravure.	1				
1. gravure cylinders	1	2	3	4	5
2. engraved plates	1	2	3	4	5
3. other (please list and circle appropriate number)					
______________________	1	2	3	4	5
Flexography Circle "1" if you do not use Flexography.	1				
1. rubber printing plates	1	2	3	4	5
2. other (please list and circle appropriate number)					
______________________	1	2	3	4	5

	None	Less than 20%	21% to 50%	51% to 80%	Over 80%
Screen Printing Circle "1" if you do not use Screen Printing.	1				
1. paper stencils	1	2	3	4	5
2. hand-cut film	1	2	3	4	5
3. photographic transfer stencils	1	2	3	4	5
4. direct emulsion photo-stencils	1	2	3	4	5
5. other (please list and circle appropriate number) ____________	1	2	3	4	5

PRESSWORK If you do not do Presswork in your plant, circle "1" and go on to Bindery.	1				
Number of employees who "do work" in this area. ( )					
In our pressroom we:					
1. print single color line work	1	2	3	4	5
2. print single color work with halftones	1	2	3	4	5
3. print two or more colors in register	1	2	3	4	5
4. print process color	1	2	3	4	5
5. test offset fountain solutions for pH	1	2	3	4	5
6. take densitometer readings on press sheets	1	2	3	4	5
7. use offset spray powder	1	2	3	4	5
8. use conventional molleton dampening system	1	2	3	4	5
9. use non-molleton type of dampening system	1	2	3	4	5
10. do numbering on press	1	2	3	4	5
11. perforate on press	1	2	3	4	5
12. die-cut on press	1	2	3	4	5
13. emboss on press	1	2	3	4	5
14. print on non-paper materials (plastic, foil, etc.)	1	2	3	4	5
15. do slitting	1	2	3	4	5
16. do sheeting of roll stock	1	2	3	4	5
17. other (please list and circle appropriate number) ____________	1	2	3	4	5
____________	1	2	3	4	5

BINDERY AND FINISHING If you do no Bindery and/or Finishing work in your plant, circle "1" and go on to Personnel Preparation.	1				
Number of employees who "do work" in this area. ( )					
In our plant we:					
1. do mechanical binding (metal, plastic, etc.)	1	2	3	4	5
2. do hard binding of books by hand	1	2	3	4	5
3. do hard binding of books by machine	1	2	3	4	5
4. make book covers	1	2	3	4	5
5. do perfect binding	1	2	3	4	5

Check the following finishing operations performed in your plant:

1.__folding
2.__trimming
3.__perforating
4.__padding
5.__tipping
6.__collating
7.__drilling
8.__gathering
9.__punching
10.__die-cutting
11.__gluing
12.__numbering
13.__foil stamping
14.__other (specify) ____________
15.__ ____________

PERSONNEL PREPARATION

Backgrounds NEEDED by Sales and Management Personnel

In the appropriate columns at the right, circle the number indicating the importance of each item in terms of the needs of Sales and Management personnel.

	Sales Personnel				Management Personnel			
	Not Important	Sometimes Beneficial	Desirable	Essential	Not Important	Sometimes Beneficial	Desirable	Essential
Understanding the flow of work through:								
1. letterpress	1	2	3	4	1	2	3	4
2. offset	1	2	3	4	1	2	3	4
3. gravure	1	2	3	4	1	2	3	4
4. flexography	1	2	3	4	1	2	3	4
5. screen printing	1	2	3	4	1	2	3	4
A basic knowledge of:								
1. graphic design principles	1	2	3	4	1	2	3	4
2. present typesetting systems	1	2	3	4	1	2	3	4
3. copy preparation procedures	1	2	3	4	1	2	3	4
4. imposition procedures	1	2	3	4	1	2	3	4
5. reproduction photography	1	2	3	4	1	2	3	4
6. process color separation	1	2	3	4	1	2	3	4
7. types of plates and their applications	1	2	3	4	1	2	3	4
8. common pressroom problems	1	2	3	4	1	2	3	4
9. commonly used bindery operations	1	2	3	4	1	2	3	4
10. cost analysis	1	2	3	4	1	2	3	4
11. economics	1	2	3	4	1	2	3	4
12. accounting	1	2	3	4	1	2	3	4
13. graphic arts quality control methods	1	2	3	4	1	2	3	4
Experience in:								
1. planning or design	1	2	3	4	1	2	3	4
2. copy preparation	1	2	3	4	1	2	3	4
3. reproduction photography	1	2	3	4	1	2	3	4
4. prepress and presswork	1	2	3	4	1	2	3	4
5. finishing	1	2	3	4	1	2	3	4

Minimum EDUCATIONAL Background

Please circle the typical educational background of PRESENT employees in:	Less than Grade 12	High School Graduate	Post High School Non Degree	College Degree	Graduate Degree
1. management	1	2	3	4	5
2. sales	1	2	3	4	5
3. skilled occupations	1	2	3	4	5
4. unskilled occupations	1	2	3	4	5

Please circle the desired education of FUTURE employees in:					
1. management	1	2	3	4	5
2. sales	1	2	3	4	5
3. skilled occupations	1	2	3	4	5
4. unskilled occupations	1	2	3	4	5

Level of Formal TRADE TRAINING

Please circle the typical trade training of PRESENT employees in:

	None	High School	Post High School	Military	College Non Degree	College Degree
1. management	1	2	3	4	5	6
2. sales	1	2	3	4	5	6
3. skilled occupations	1	2	3	4	5	6
4. unskilled occupations	1	2	3	4	5	6

Please circle the desired trade training of FUTURE employees in:

1. management	1	2	3	4	5	6
2. sales	1	2	3	4	5	6
3. skilled occupations	1	2	3	4	5	6
4. unskilled occupations	1	2	3	4	5	6

GENERAL INFORMATION

Please indicate the percentage of your production time in each of the following areas.

1. ____letterpress
2. ____offset
3. ____gravure
4. ____flexography
5. ____screen printing

Please rank the three (3) departments in which you find the greatest shortage of qualified personnel. Place a number one (1) in front of department with greatest shortage.

1. ____layout and design
2. ____composition and imposition
3. ____photographic
4. ____printing plates
5. ____pressroom
6. ____bindery

Is public or community relations identified as a separate task in your operation? Yes ____ No ____

If the above answer is Yes, check the person or persons responsible for this function in your company.

1. ____Owner
2. ____Management Personnel
3. ____Sales Personnel
4. ____Public Relations Director
5. ____Other (specify)________________________

____Please check if you would like to receive a summary of the completed report.

Graphic Arts Inventory for Education

P. O. Box 7943
Clemson University
Clemson, South Carolina 29631

According to our records, we have not yet received your completed form for the second phase of the "Graphic Arts Inventory for Education." If you have already mailed the form, please disregard this letter. If not, we would greatly appreciate you completing and returning the form in the prepaid envelope. Your assistance in this project is vital.

The goal of the "Graphic Arts Inventory for Education" is to develop curriculum to provide trained employees for your future needs. In fact, steps are already being taken to begin development of these instructional programs. Without the information which only people like you can provide, we will not have the necessary material on which to base valuable decisions. It is for this reason that we strongly urge you to assist us.

We look forward to receiving your completed form.

Sincerely yours,

J. Page Crouch
Project Director

David W. Dailey
Research Coordinator

Help develop better education for better manpower!

Graphic Arts Inventory for Education

P.O. Box 7943
Clemson University
Clemson, South Carolina 29631

As of today, according to our records, we have still not received your completed form of the "Graphic Arts Inventory for Education." Due to the importance of this project, we are sending you a second form along with a prepaid return envelope.

We cannot emphasize too highly the necessity that you return this completed form. Although you may be engaged in only one area of graphic arts, please fill in the information that applies to your organization.

The training of your future employees depends on the results of this project. It is for this reason we urge you to assist us.

We look forward to receiving your completed form.

Sincerely yours,

J. Page Crouch
Project Director

David W. Dailey
Research Coordinator

Help develop better education for better manpower!

Graphic Arts Inventory for Education

P.O. Box 7943
Clemson University
Clemson, South Carolina 29631

We appreciated the information you gave us over the telephone. As mentioned in our conversation, in order to complete the "Graphic Arts Inventory for Education" we need additional information about the specific processes you are using. Simply by filling out the enclosed questionaire and returning it to us in the enclosed prepaid envelope you can be counted as a printer interested in the training of your future employees. This information will give us a basis upon which to structure new educational programs to graduates will be taught current methods and technology.

We are interested in the plant operations performed in your organization, the desired personnel preparation, and other general information which you can provide. Please answer all questions as per instructions at the beginning of each section. Additional space is provided at the end of each section for other methods of procedures you use and feel are important.

It is vital that you complete this form and return it in order that we may make an accurate appraisal of all phases of the printing industry. We are concerned with the one-man shop as well as the large organizations, specialty shops and in-plant printers.

Thank you for your cooperation in helping us with this study so that we may help you by training better employees.

Sincerely yours,

J. Page Crouch Project Director	David W. Dailey Research Coordinator

Help develop better education for better manpower!

Appendix B

Chi Square Computations

Chi Square Test of Post Card Data

Chi Square Test of Selected Long Form Data

Map of Area Covered
In Five Percent Personal Interview Followup

Chi Square Computations

$$x^2 = \Sigma \left[\frac{(f_o - f)^2}{f} \right]$$

f_o = actual frequencies

f = expected frequencies

$$\text{Expected } f = \frac{\text{Raw total x Column total}}{\text{Grand total}}$$

$$f = \frac{(f_o \times \Sigma f_{o1})}{(f_{o_1} + \Sigma f_{o_2})}$$

Comparison of post card survey data

$x^2 = 14.46$

Comparison of selected long form data

$x^2 = 8.16$

Chi Square Test of Post Card Data

Variables	Volunteer Returns			Telephone Follow-up			Sum of the actual $(f_o)_v + (f_o)_t$
	Actual $(f_o)_v$	Expected (f)	x^2	Actual $(f_o)_t$	Expected (f)	x^2	
Daily newspaper	39	36.9	.12	1	3.1	1.42	40
Weekly newspaper	102	103.2	.01	10	8.8	.16	112
General commercial	523	523.5	0.00	45	44.5	0.00	568
In-plant printing	108	103.2	.22	4	8.8	2.62	112
Book printing	78	81.1	.12	10	6.7	1.62	88
Business forms	184	188.9	.13	21	16.0	1.56	205
Offset	681	669.1	.21	45	56.8	2.45	726
Letterpress	495	491.2	.03	38	41.7	.33	533
Screen printing	45	43.3	.07	2	3.7	.78	47
Hot composition	330	334.5	.06	33	28.4	.74	363
Cold composition	384	388.0	.04	37	33.0	.48	421
Binding	326	331.8	.10	34	28.2	1.19	360
Column total	3295			280			3575
	N=801			N=62			

Chi Square Test of Selected Long Form Data

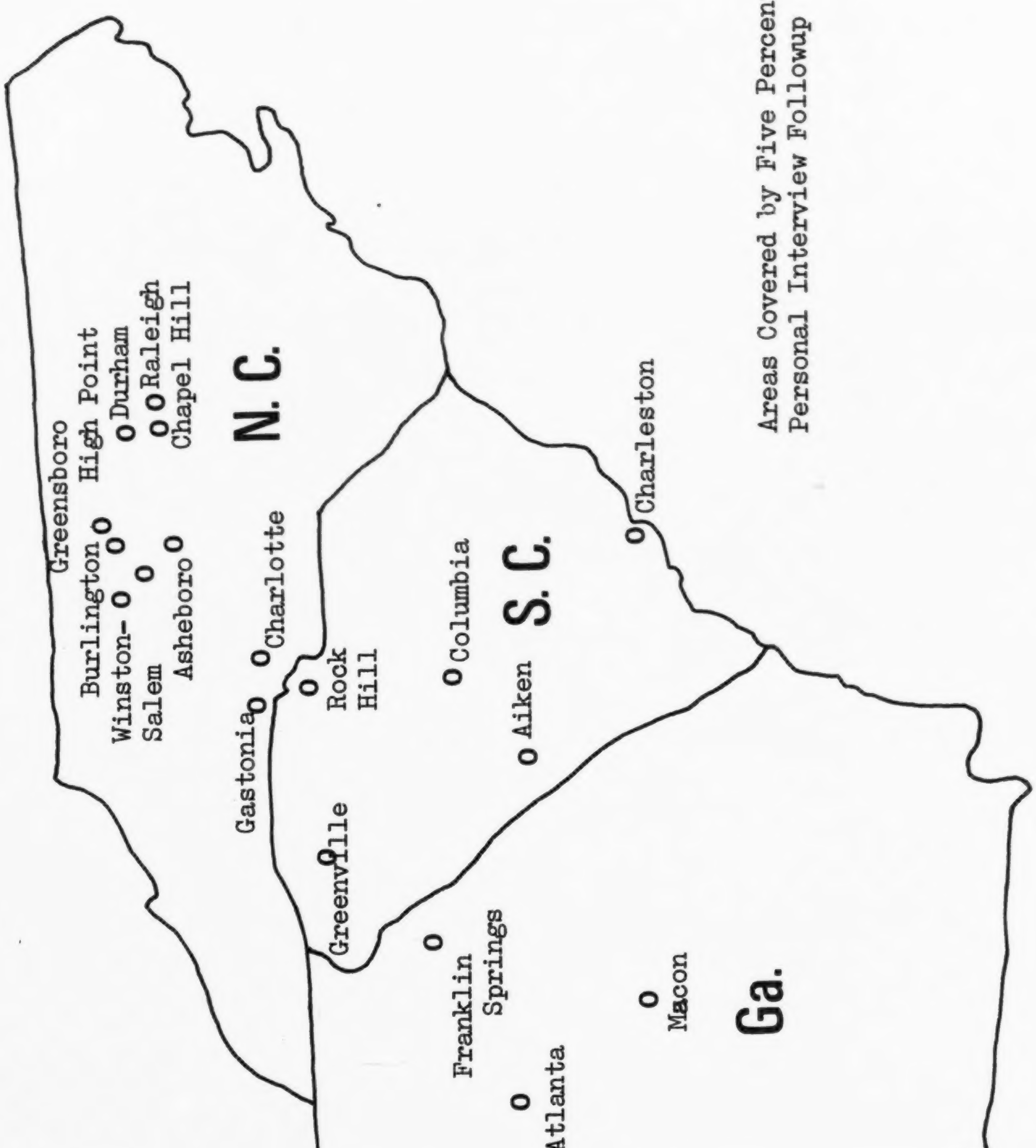
Variables	Volunteer Returns			5% Personal Interview Follow-up			
	Actual $(f_o)_A$	Expected (f)	x^2	Actual $(f_o)_5$	Expected (f)	x^2	Sum of the actual $(f_o)_A + (f_o)_5$
*1	56	57.0	.02	3	2.0	.50	59
2	271	270.0	0.00	8	9.3	.19	279
3	6	6.8	.09	1	.2	3.20	7
4	227	227.1	0.00	8	7.8	0.00	235
5	196	194.3	.01	5	6.7	.43	201
6	177	177.8	0.00	7	6.1	.13	184
7	162	160.4	.02	4	5.5	.41	166
8	202	204.0	.02	9	7.0	.57	211
9	156	156.6	0.00	6	5.4	.07	162
10	168	168.2	0.00	6	5.8	.01	174
11	182	184.6	.04	9	6.4	1.05	191
12	274	274.5	0.00	10	9.4	.04	284
13	164	163.4	0.00	5	5.6	.06	169
14	172	171.1	0.00	5	5.9	.14	177
15	202	201.5	0.00	6	6.9	.12	208
16	185	182.7	.03	4	6.3	.84	189
17	124	124.7	0.00	5	4.3	.11	129
Column total	2924			101			3025
	N=494			N=16			

---

*Variables compared are shown on the following page.

Variables Used for Chi Square Comparisons

1. Companies printing over seventy-five percent by letterpress.
2. Companies printing over seventy-five percent by offset.
3. Companies printing over seventy-five percent by screen process.
4. Companies which customers furnish complete layouts less than twenty percent.
5. Companies which use hand-set types less than twenty percent.
6. Companies which do line photography over eighty percent.
7. Companies which print from hand-set type less than twenty percent.
8. Companies which print from presensitized plates over eighty percent.
9. Companies which print single color line work over eighty percent.
10. Companies which print single color with halftones less than twenty percent.
11. Companies which regard understanding the flow of work through letterpress essential for managers.
12. Companies which regard understanding the flow of work through offset essential for managers.
13. Companies which regard a basic knowledge of graphic design principles essential for managers.
14. Companies which regard a basic knowledge of present typesetting systems desirable for salesmen.
15. Companies which regard a basic knowldge of common pressroom problems essential for managers.
16. Companies which regard experience in planning or design desirable for salesmen.
17. Companies which regard experience in reproduction photography essential for managers.


Greensboro
High Point
Durham
Raleigh
Chapel Hill
Burlington
Winston-Salem
Asheboro
N.C.
Charlotte
Gastonia
Rock Hill
Columbia
S.C.
Aiken
Charleston
Greenville
Franklin Springs
Atlanta
Macon
Ga.

Areas Covered by Five Percent Personal Interview Followup

Appendix C

Personal Interview Questions
for
Representatives of Major and Selected Companies

List of Representatives Interviewed by States
North Carolina
South Carolina
Georgia

Personal Interview Questions for Representatives of Major and Selected Companies

Layout and Copy Preparation

1. What technical knowledge is needed by people in this area?
2. What are the major problems encountered related to the work done in this department?
3. List some of the basic experiences you would desire of new employees who have studied graphic arts in school.
4. Do you have any preference for male or female employees? Or does one do a better job?
5. Do you see any new developments coming or on the market which will affect the work of people in layout and design, such as the stat cameras?
6. Where do you get employees for this department?

Composition and Imposition

1. What technical knowledge is needed by people in this area?
2. What are the major problems encountered related to the work done in this department?
3. List some of the basic experiences you would desire of new employees who have studied graphic arts in school.
4. Do you have any preference for male or female employees?
5. Do you see any new developments coming or on the market which will affect the work of people in composition and imposition?
6. Where do you get employees for this department?

Photographic Department

1. What are the major problems encountered related to the work done in this department?
2. Do you see any new developments coming or on the market which will affect the work of people in your photographic department?
3. Do you have any preference for male or female employees?
4. Where do you get employees for this department?

Stripping

1. What technical knowledge is needed by people in this area?
2. What are the major problems encountered related to the work done in this department?
3. List some of the basic experiences you would desire of new employees who have studied graphic arts in school.
4. Do you have any preference for male or female employees?
5. Do you see any new developments coming or on the market which will affect the work of people in stripping?
6. Where do you get employees for this department?

Platemaking

1. What technical knowledge is needed by people in this area?
2. What are the major problems encountered related to the work done in this department?
3. List some of the basic experiences you would desire of new employees who have studied graphic arts in school.
4. Do you have any preference for male or female employees?
5. Do you see any new developments coming or on the market which will affect the work of people in platemaking?
6. Where do you get people for this department?

Presswork

1. What technical knowledge is needed by people in this area?
2. What are the major problems encountered related to the work done in this department?
3. List some of the basic experiences you would desire of new employees who have studied graphic arts in school.
4. Do you have any preference of male or female employees?
5. Do you see any new developments coming or on the market which will affect people in the pressroom?
6. Where do you get employees for this department?

Bindery-Finishing

1. What technical knowledge is needed by people in this area?
2. What are the major problems encountered related to the work done in this department?
3. List some of the basic experiences you would desire of new employees who have studied graphic arts in school.
4. Do you have any preference for male or female employees?
5. Do you see any new developments coming or on the market which will affect the work of people in the bindery area?
6. Where do you get employees for this department?

Miscellaneous

1. In what ways could or would your company help the schools to develop better educational programs?

   _____cooperative programs
   _____equipment
   _____give talks
   _____field trips
   _____supplies
   _____summer work
   _____other

2. What is your opinion regarding production printing by school graphic arts classes?
3. What personal traits do you look for in new employees?

4. Will a graduate of a high school vocational graphic arts course start at a wage higher than a person with no experience off the street?

____no ____yes

5. What are the major problems you encounter when you hire kids right out of high school?

____attendance ____acceptance of supervision

____willingness to work

6. Do you have any other general recommendations which we may have overlooked that would suggest for planning school programs?

Conclusion

Thank you for your cooperation and time.

Do you have any objection to having your name and the name of your company acknowledged in the appendix of our report as having cooperated in this study?

____no ____yes, do not print

North Carolina

1.	Malcolm Bagby Jordan Business Forms, Inc.	Charlotte
2.	James A. Brady, Jr. Brady Printing Co.	Statesville
3.	Kenneth I. Brooks Offset Printing Co.	Gastonia
4.	George Butler Rexham Corp. Simpson Plant	Greensboro
5.	James M. Cates Observer Printing House	Charlotte
6.	L. B. Christian and Robert C. Klatt Creative Printers, Inc.	Chapel Hill
7.	Bruce Clark Screencraft, Inc.	Charlotte
8.	Chester F. Cline Graphic-South	Charlotte
9.	W. H. Craig Fisher-Harrison Corp.	Greensboro
10.	James W. Daniels Daniels Graphics	Ashville
11.	Waldo Durham Durham Printing Co.	Asheboro
12.	Braxton Flye The Graphic Press, Inc.	Raleigh
13.	N. W. Foust Washburn Press, Inc.	Charlotte
14.	Bruce Funderburk Carolina Ruling and Binding Co., Inc.	Charlotte
15.	Walter Furr Colony Printers, Inc.	Charlotte
16.	Wm. W. Gilbert Gilbert Printing Co., Inc.	Asheville
17.	John R. Gordon Winston Printing Co.	Winston-Salem

18.	W. B. Hall, Jr. Hall Printing Co.	High Point
19.	Ottis Holland and Roger Boggs Holt Mfg. Co.	Burlington
20.	Raleigh A. Hunter, Jr. Hunter Publishing Co.	Winston-Salem
21.	Earl Kimball Delmar Printing Co.	Charlotte
22.	Frank Love The Dowd Press, Inc.	Charlotte
23.	Bob Moore Thomasville Printing Co.	Thomasville
24.	Ralph Moore and H. Greene Commercial Printing Co.	Raleigh
25.	Thomas W. Reese Hickory Printing Co.	Hickory
26.	D. E. Ritter Computer Business Forms Co.	Greensboro
27.	Bill Rude and Charles Gossage Robinson Tag and Label Co.	Greensboro
28.	Wayne Ruth and Richard Hallman High Point Electronic Card Co.	High Point
29.	Jim Shepherd Shepherd Brothers, Inc.	Charlotte
30.	Paul Simson Snyder Printing of Concord, Inc.	Concord
31.	Edward B. Warren Craftsman Printing Co.	Charlotte
32.	Richard T. Whittington and W. C. Alderson Groves Printing Co., Inc.	Asheville
33.	Anonymous	

South Carolina

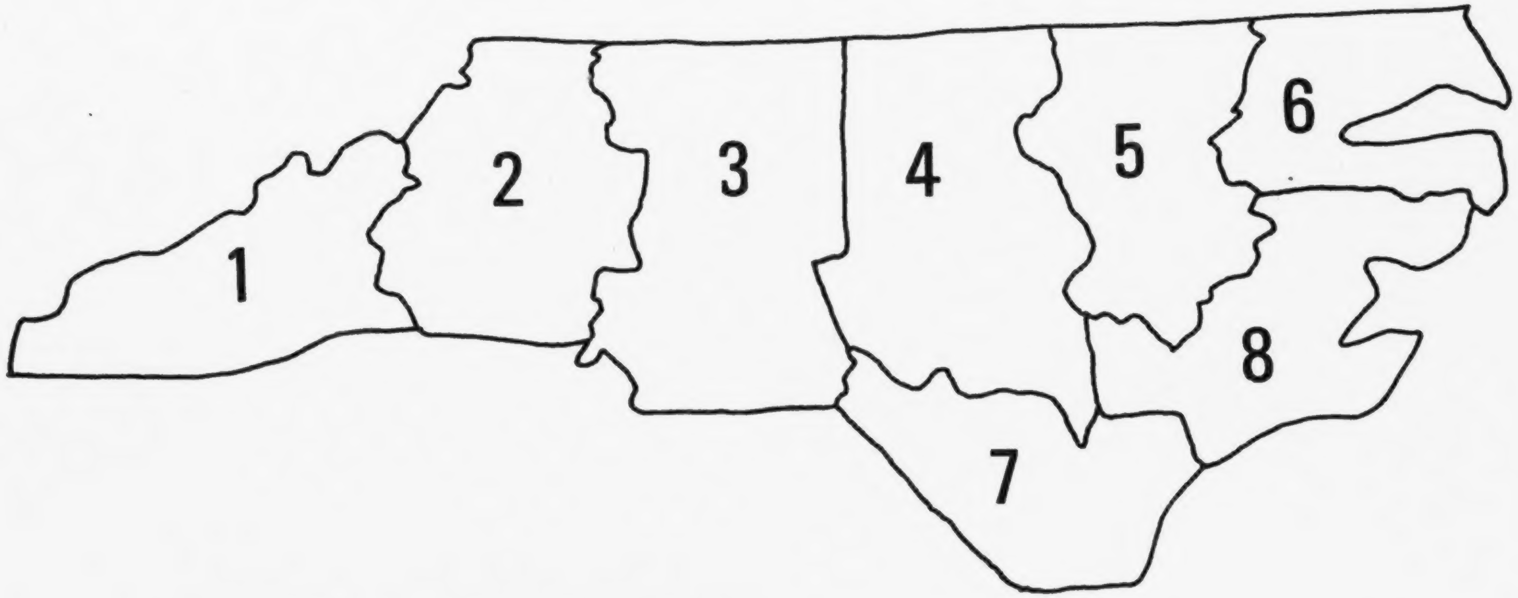
1.	Vergil Abrams	Abrams and Banister	Greenville
2.	Joe Banister and Mac McGarity	Scott Press	Greenville
3.	Howard B. Carlisle, III and Otis Bishop	Band and White, Inc.	Spartanburg
4.	Carroll Carter and Harold Hair	R. L. Bryan Co.	Columbia
5.	Julian A. Foster	Piedmont Press, Inc.	Spartanburg
6.	James P. Furlong	John J. Furlong and Sons	Charleston
7.	Julius Green	Vogue Press	Columbia
8.	High Jacobs	Jacobs Press, Inc.	Clinton
9.	B. G. Keys	Keys Printing Co.	Greenville
10.	Jerry W. Little, Jr. and Al Howell	Electric City Printing Co.	Anderson
11.	Herbert H. Provence, Jr.	Provence-Jerrard Co.	Greenville
12.	Jack Ragsdale	The Easley Progress	Easley
13.	Larry Reynolds	Art Printing Co.	Rock Hill
14.	Carroll M. Spencer	State Printing Co.	Columbia
15.	Charles Stone	Crowson-Stone Printing Co.	Columbia
16.	Danny Varn	Columbia Office Supply Co.	Columbia

Georgia

1.	Bill Bean W. R. Bean and Sons	Atlanta
2.	Jon D. Christman Foote and Davies	Doraville
3.	Cecil Griffin Retail Credit Co.	Chamblee
4.	Jack Moss and Bill Hill Crest Screen Process	Atlanta
5.	Mr. Hall Hall Printing and Office Supply Co.	Marietta
6.	Lamar Powers LithoKrome Co.	Columbus
7.	Joe Segal Stein Printing Co.	Atlanta
8.	A. C. Shealy Advocate Press	Franklin Springs
9.	Anonymous	
10.	Anonymous	

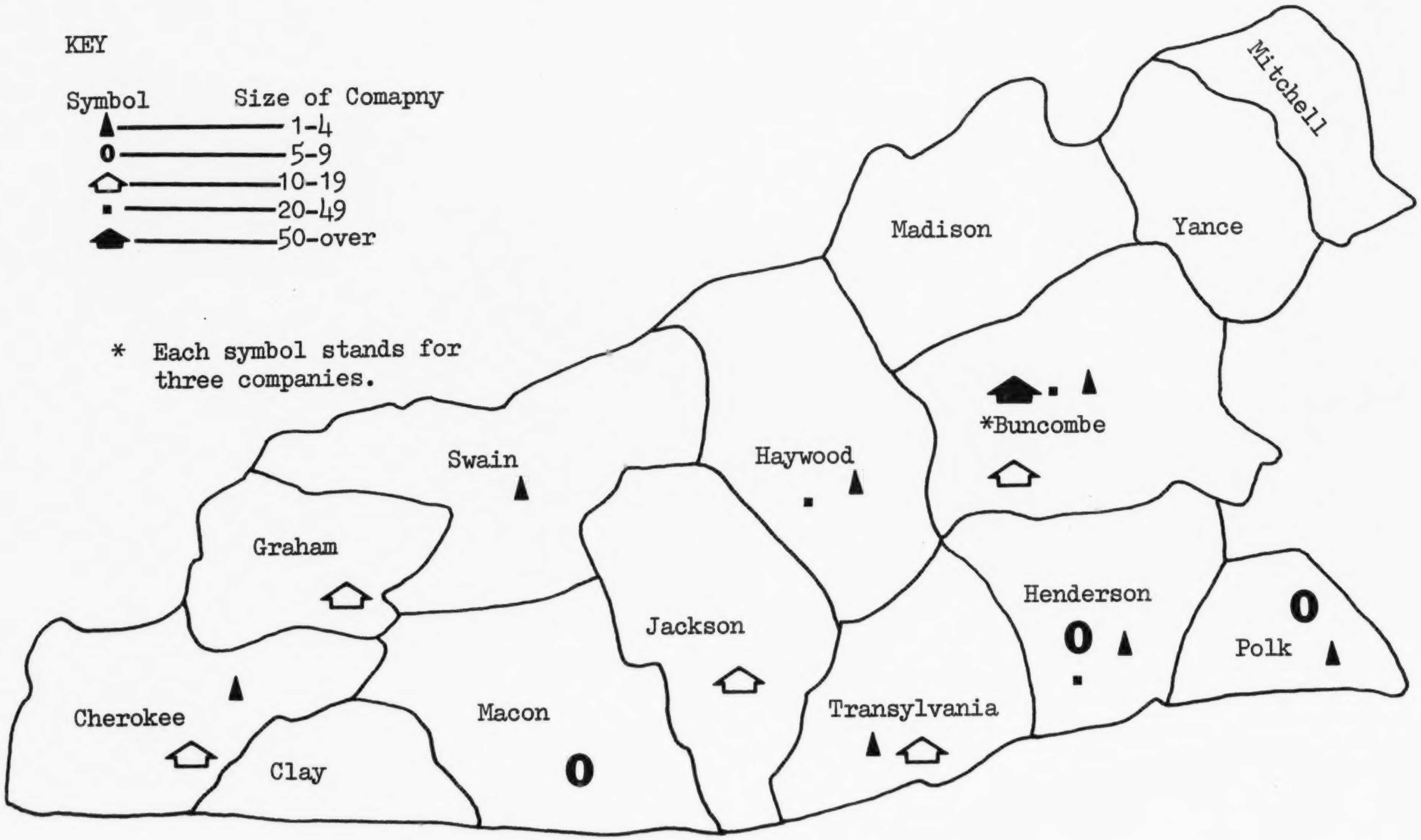
Appendix D

Maps Indicating Companies Surveyed Within Counties By Number of Employees

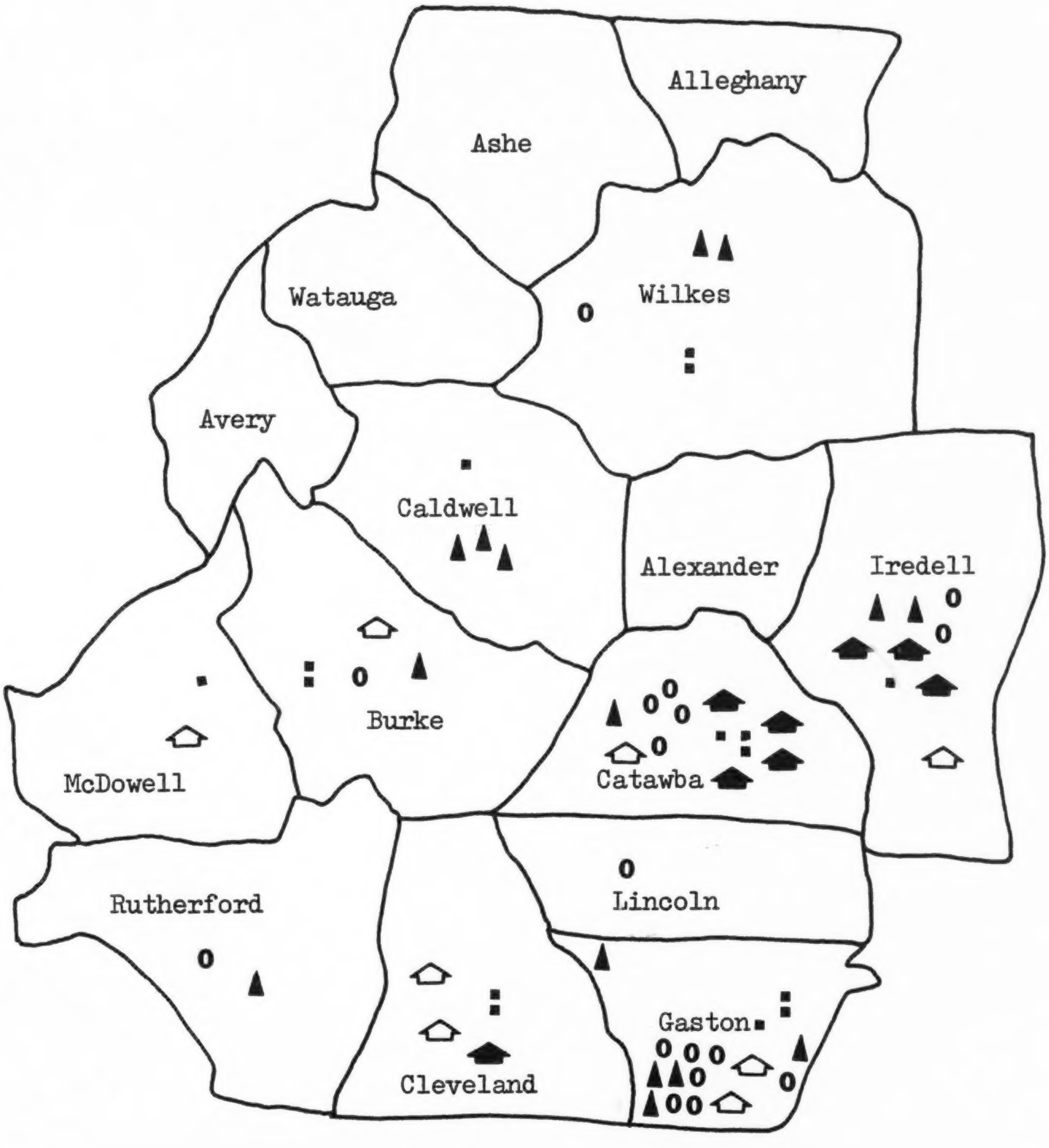


NORTH CAROLINA

Numbers represent the area covered on each county map.


KEY
Symbol
Size of Comapny
▲ 1-4
0 5-9
10-19
▪ 20-49
50-over
* Each symbol stands for three companies.
Mitchell
Yance
Madison
*Buncombe
Haywood
Swain
Graham
Polk
Henderson
Jackson
Transylvania
Macon
Cherokee
Clay

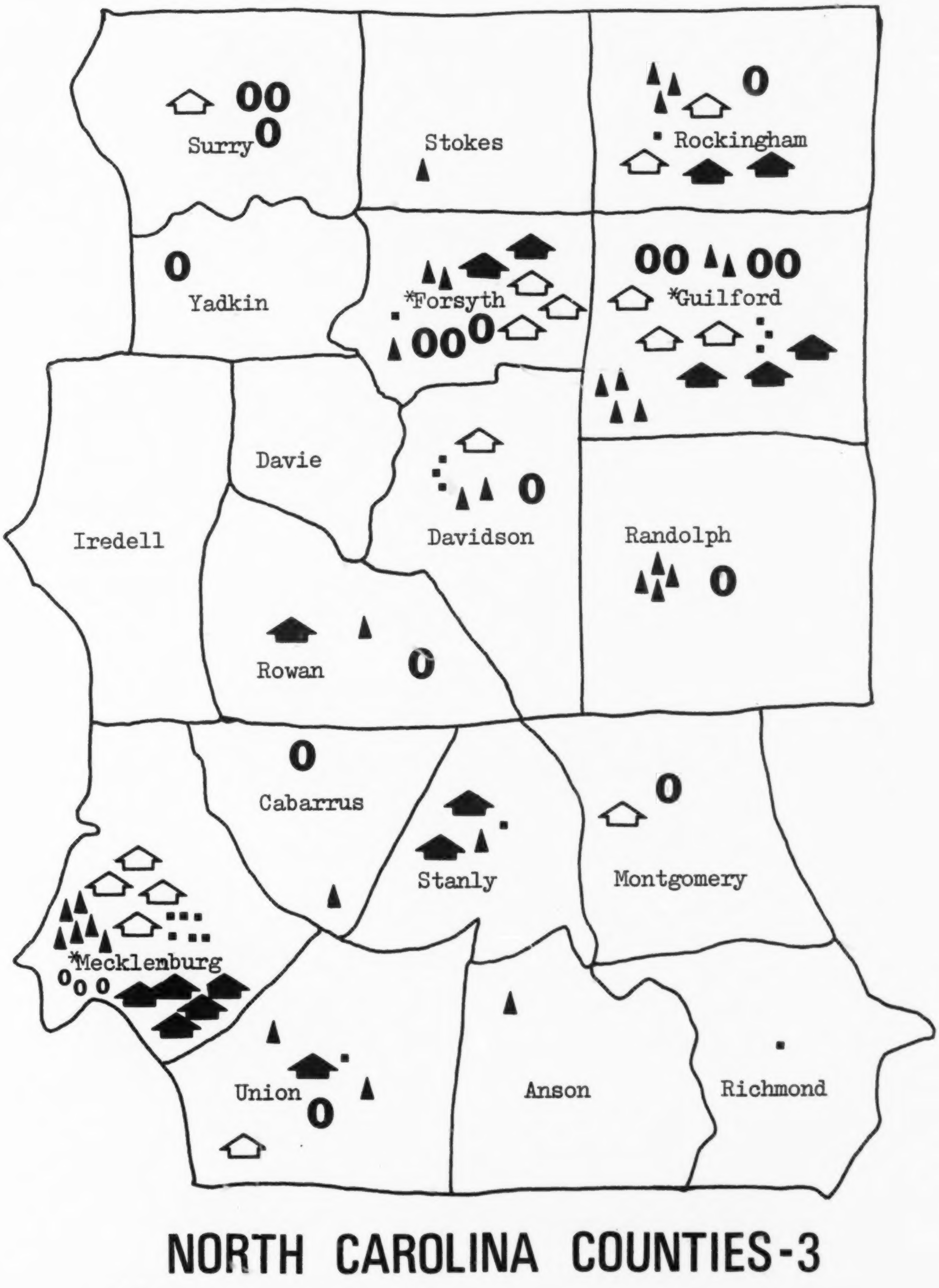
NORTH CAROLINA COUNTIES-1


Alleghany
Ashe
Wilkes
Watauga
Avery
Caldwell
Alexander
Iredell
Burke
McDowell
Catawba
Lincoln
Rutherford
Cleveland
Gaston

NORTH CAROLINA COUNTIES-2

KEY

Symbol	Size of Company
▲	1-4
0	5-9
⌂	10-19
▪	20-49
☗	50-over

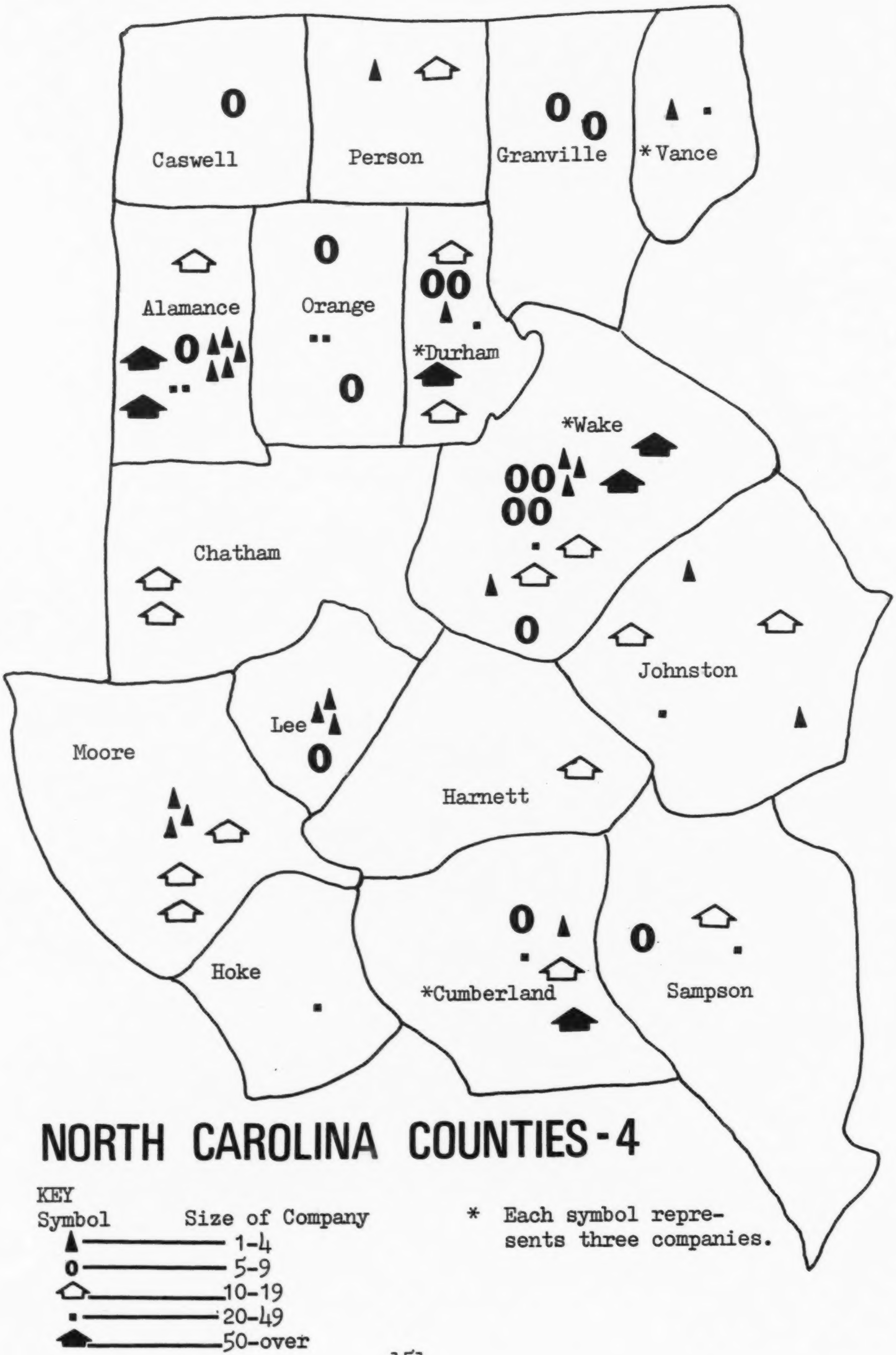

Surry
Stokes
Rockingham
Yadkin
*Forsyth
*Guilford
Davie
Iredell
Davidson
Randolph
Rowan
Cabarrus
Stanly
Montgomery
*Mecklenburg
Union
Anson
Richmond

NORTH CAROLINA COUNTIES-3

KEY

Symbol	Size of Company	Symbol	Size of Company
▲	1-4	■	20-49
0	5-9	☗	50-over
⌂	10-19		

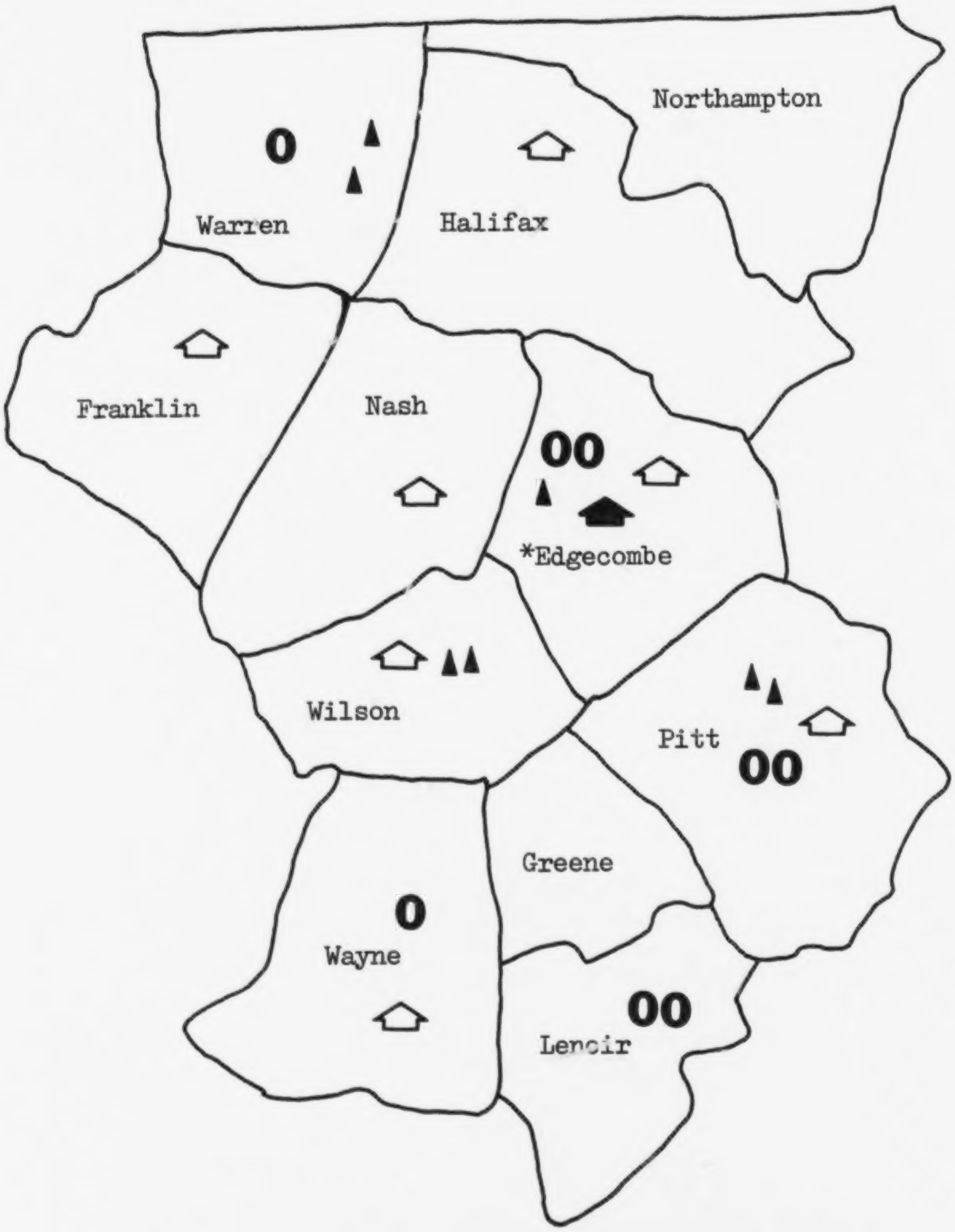
* Each symbol represents three companies.


Caswell
Person
Granville
*Vance
Alamance
Orange
*Durham
*Wake
Chatham
Johnston
Lee
Moore
Harnett
Hoke
*Cumberland
Sampson

NORTH CAROLINA COUNTIES-4

KEY
Symbol — Size of Company
▲ — 1-4
0 — 5-9
⌂ — 10-19
■ — 20-49
☗ — 50-over

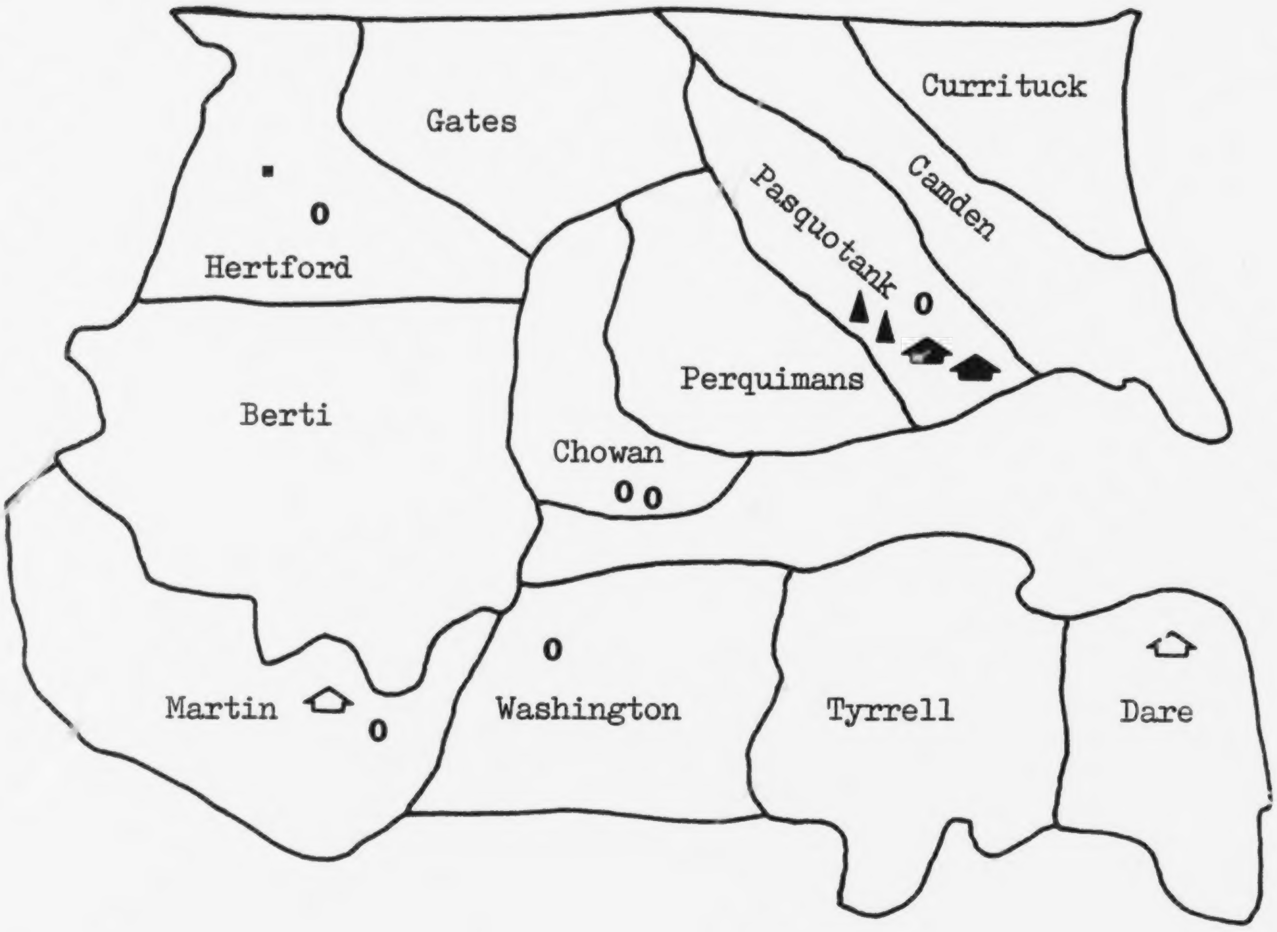
* Each symbol represents three companies.


Northampton
Warren
Halifax
Franklin
Nash
*Edgecombe
Wilson
Pitt
Greene
Wayne
Lenoir

NORTH CAROLINA COUNTIES-5

KEY

Symbol	Size of Company
▲	1-4
o	5-9
⌂	10-19
▪	20-49
⬟	50-over
*	Each symbol represents three companies in this county.

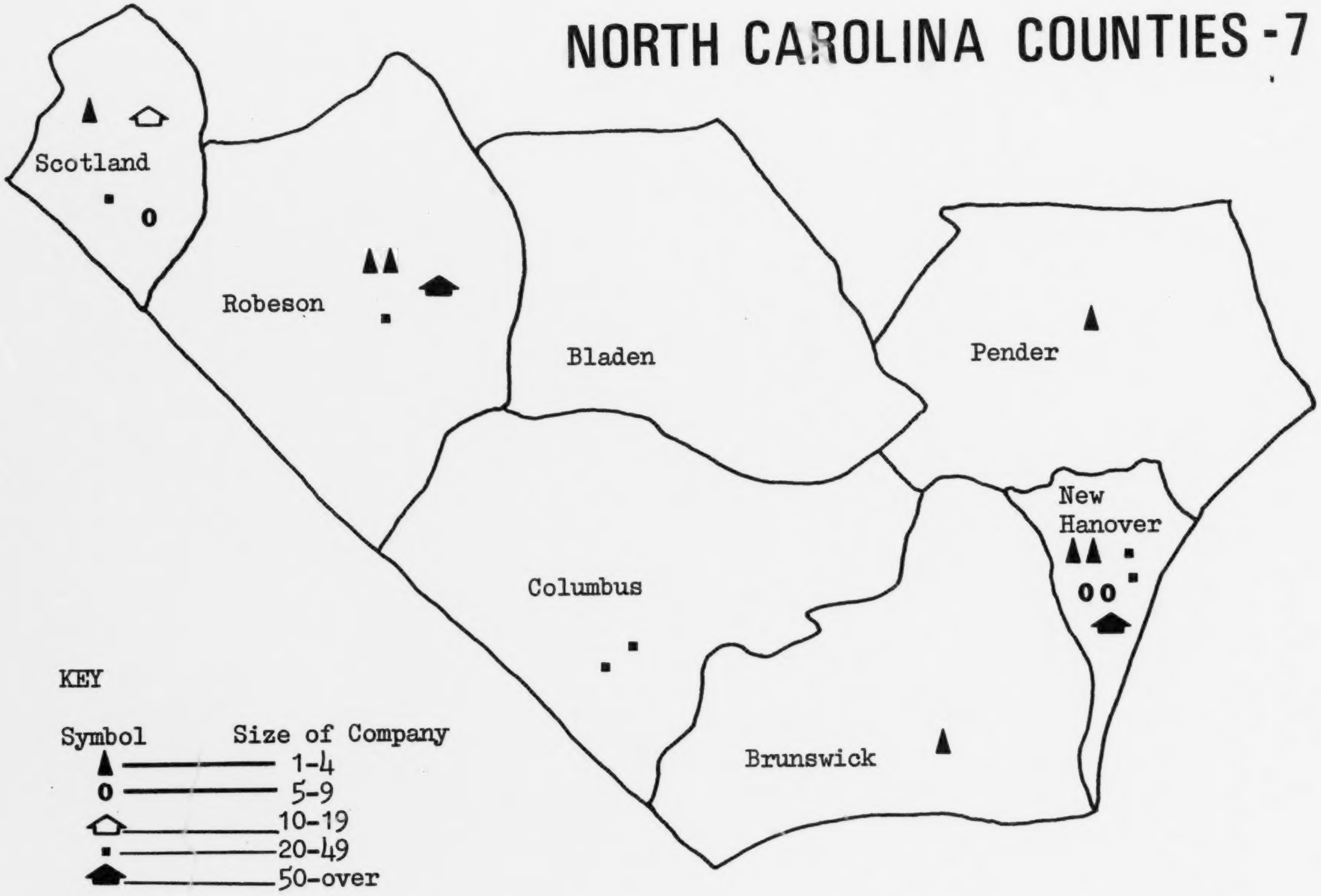

Currituck
Gates
Camden
Pasquotank
Hertford
Perquimans
Berti
Chowan
Martin
Washington
Tyrrell
Dare

KEY

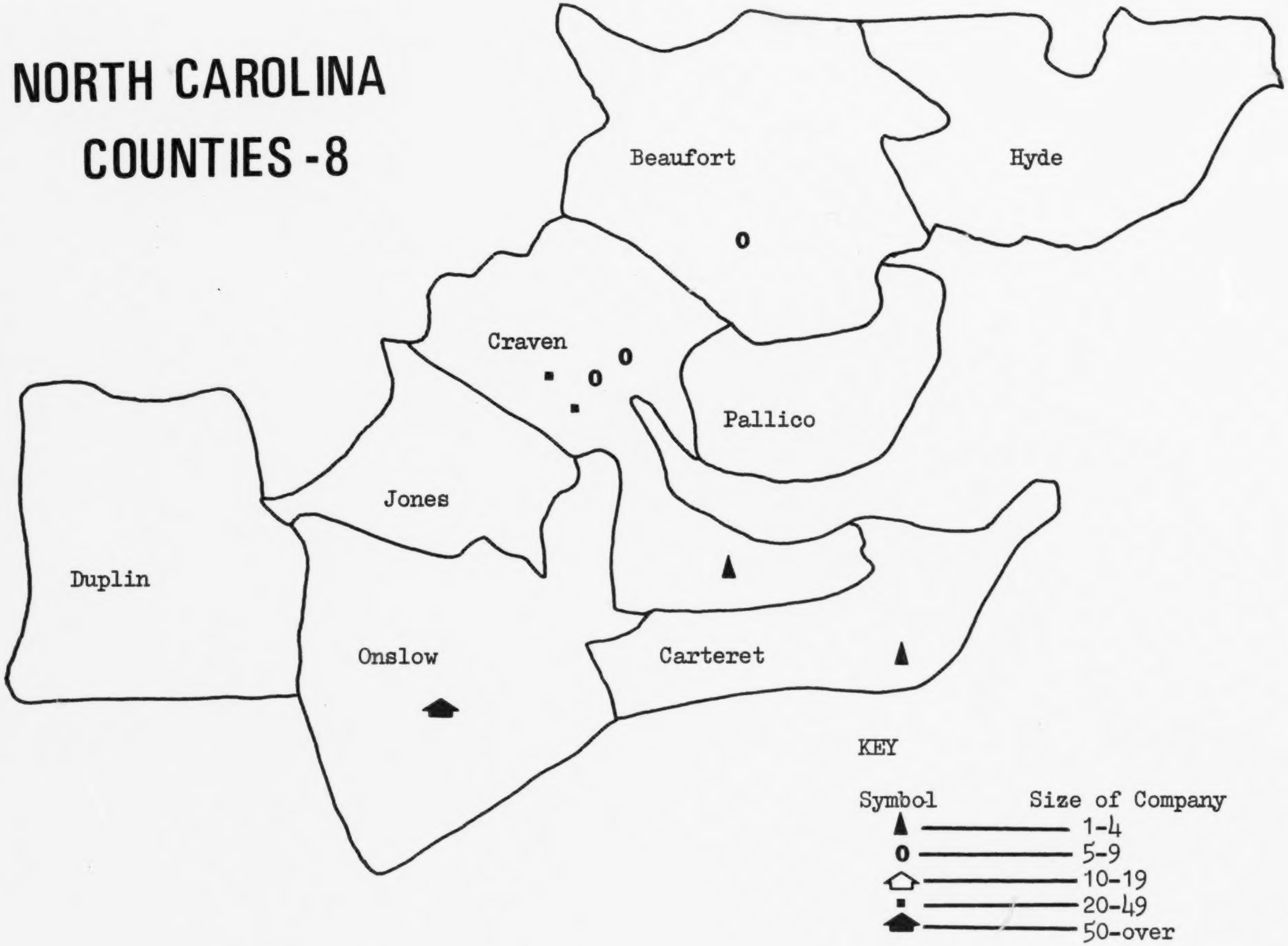
Symbol	Size of Company
▲	1-4
o	5-9
⌂	10-19
▪	20-49
⬟	50-Over

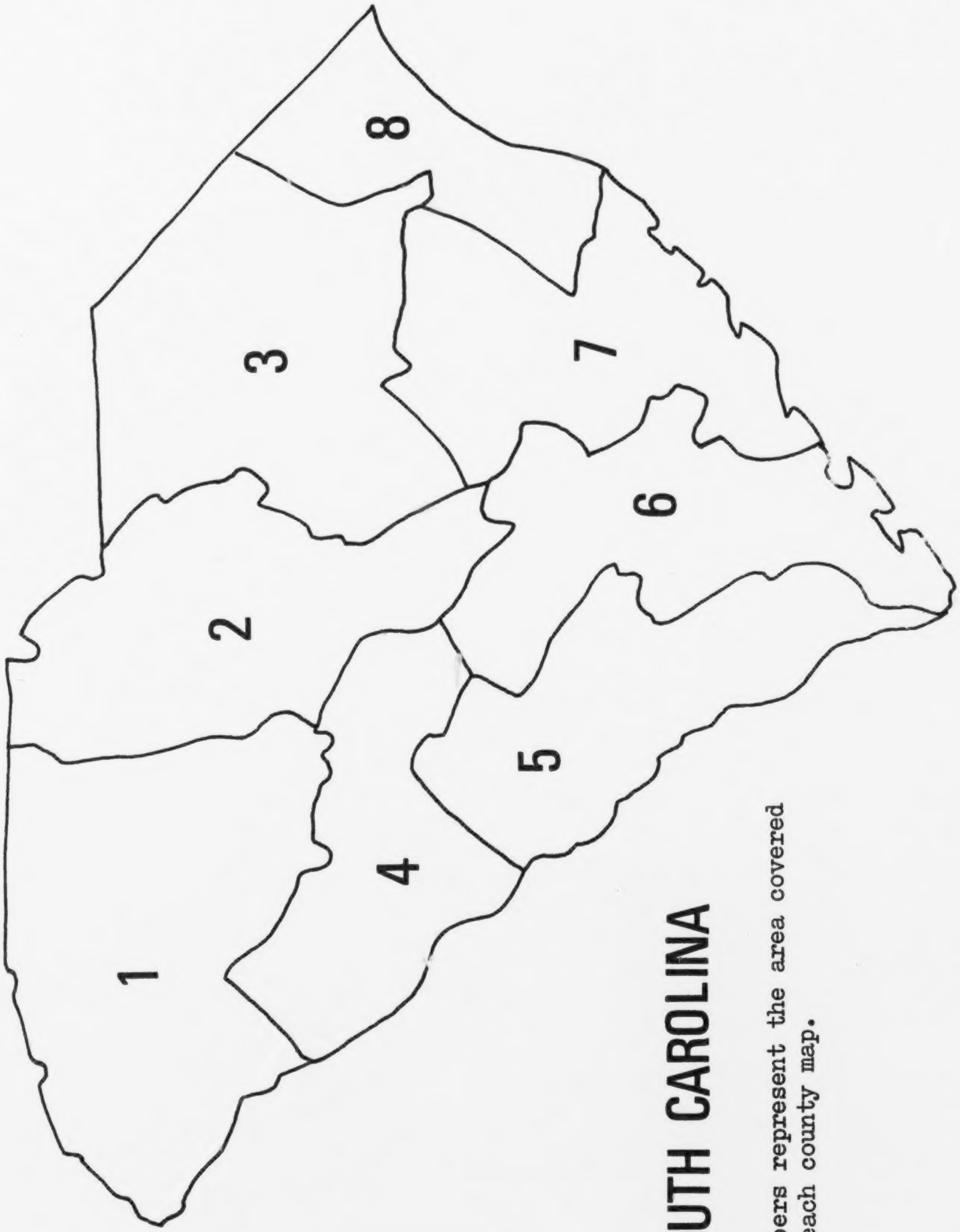
NORTH CAROLINA COUNTIES-6

NORTH CAROLINA COUNTIES -7


Scotland
Robeson
Bladen
Pender
Columbus
New Hanover
Brunswick
KEY
Symbol
Size of Company
▲ 1-4
o 5-9
⌂ 10-19
▪ 20-49
⬟ 50-over

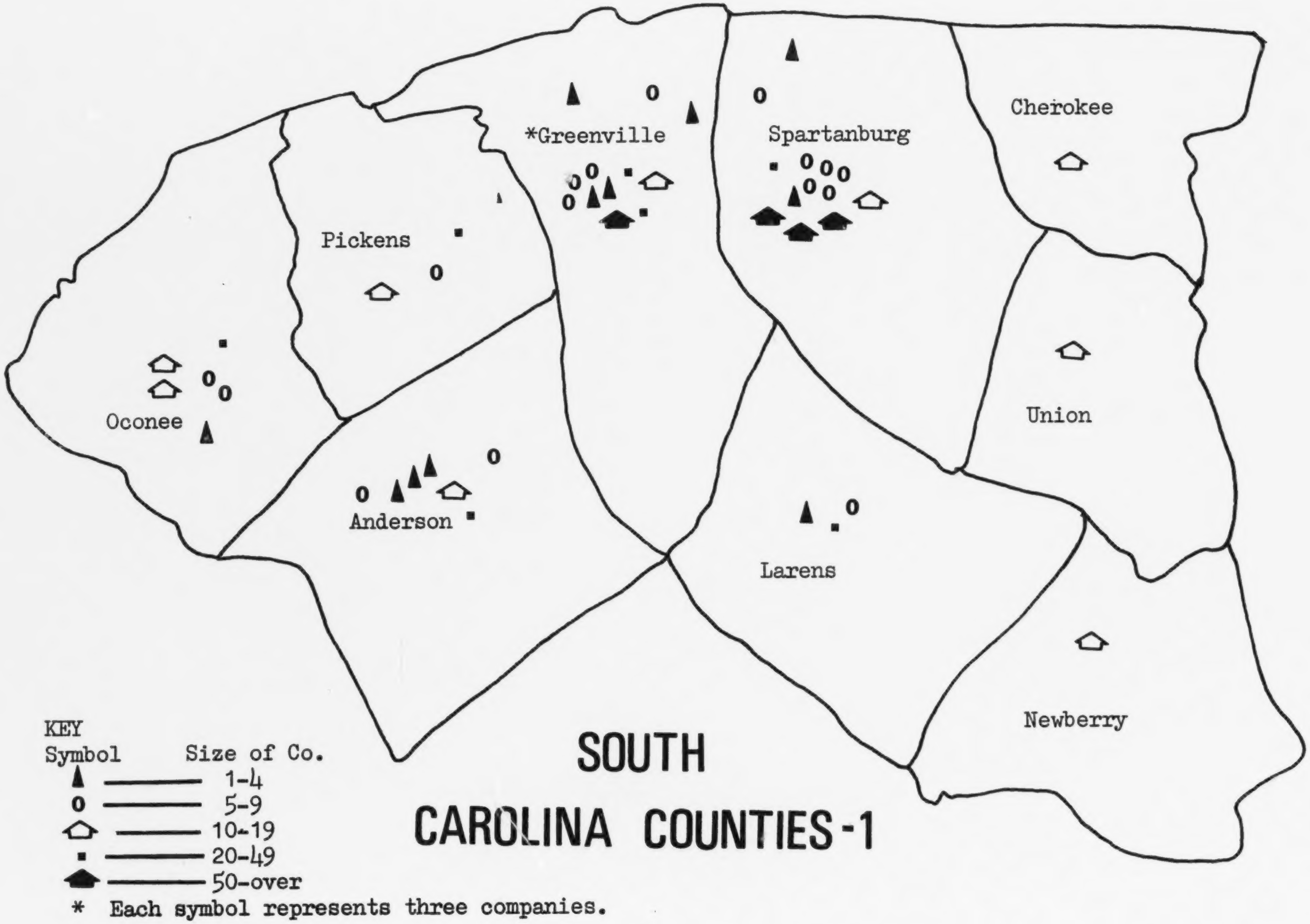
NORTH CAROLINA
COUNTIES -8


Beaufort
Hyde
Craven
Pallico
Jones
Duplin
Onslow
Carteret
KEY
Symbol
Size of Company
▲ 1-4
0 5-9
⌂ 10-19
▪ 20-49
⬆ 50-over



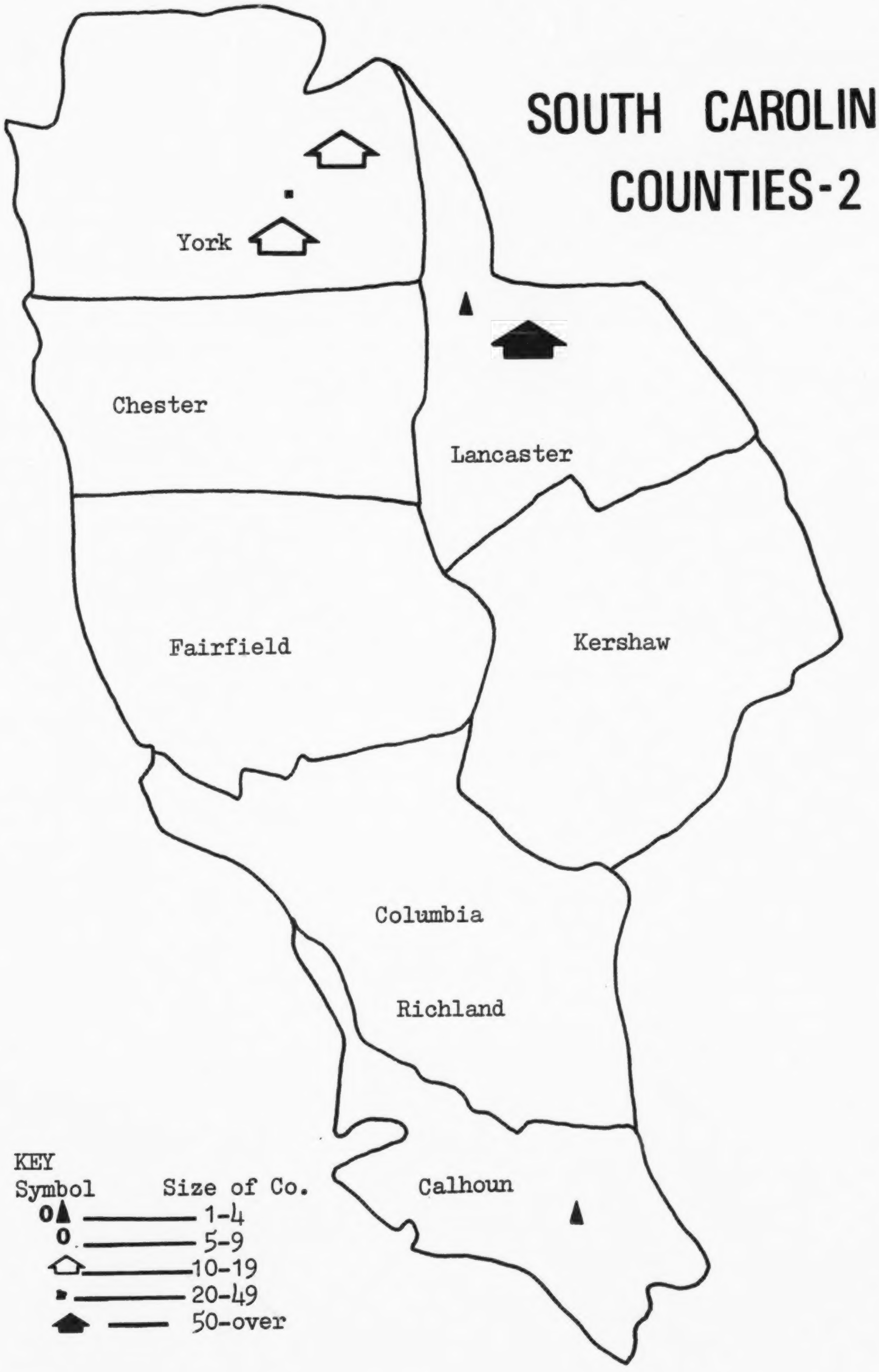
SOUTH CAROLINA

Numbers represent the area covered on each county map.

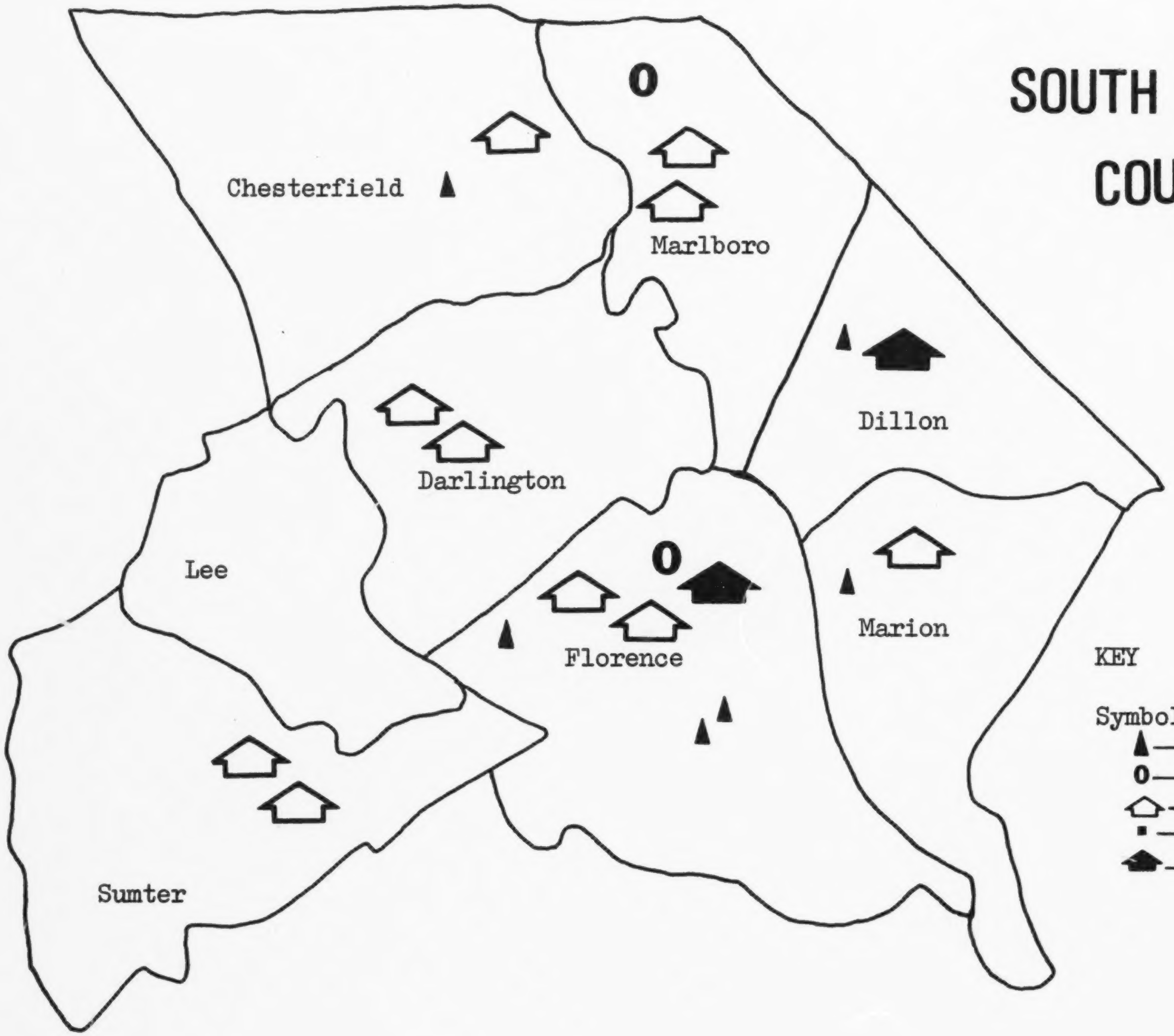

Cherokee
Spartanburg
*Greenville
Pickens
Oconee
Anderson
Larens
Union
Newberry
KEY
Symbol
Size of Co.
▲ 1-4
o 5-9
⌂ 10-19
▪ 20-49
☗ 50-over
* Each symbol represents three companies.

SOUTH CAROLINA COUNTIES-1

SOUTH CAROLINA
COUNTIES-2

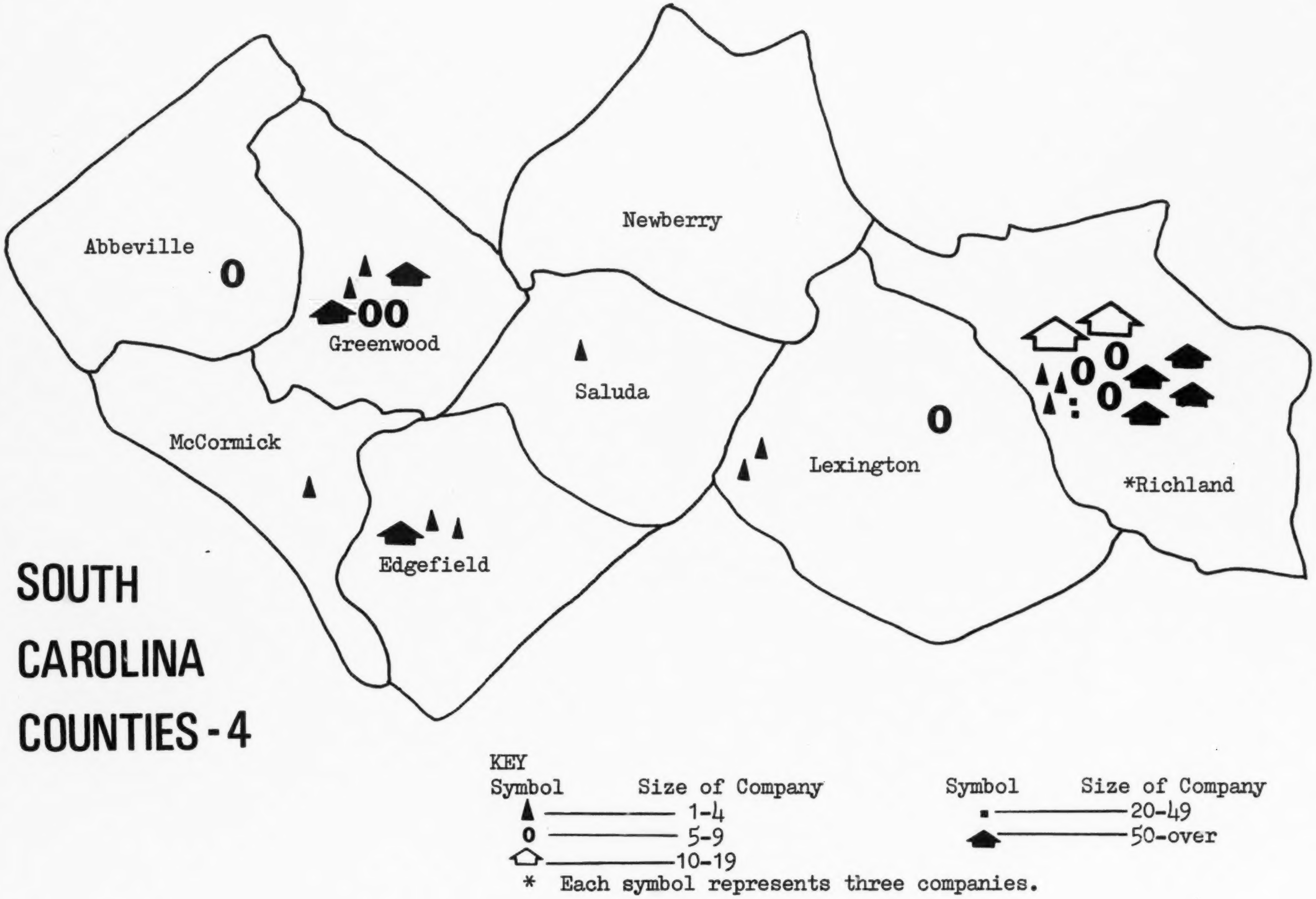

York
Chester
Lancaster
Fairfield
Kershaw
Columbia
Richland
Calhoun
KEY
Symbol Size of Co.
o▲ 1-4
o 5-9
⌂ 10-19
▪ 20-49
▲ 50-over

SOUTH CAROLINA COUNTIES-3


Chesterfield
Marlboro
Dillon
Darlington
Lee
Florence
Marion
Sumter

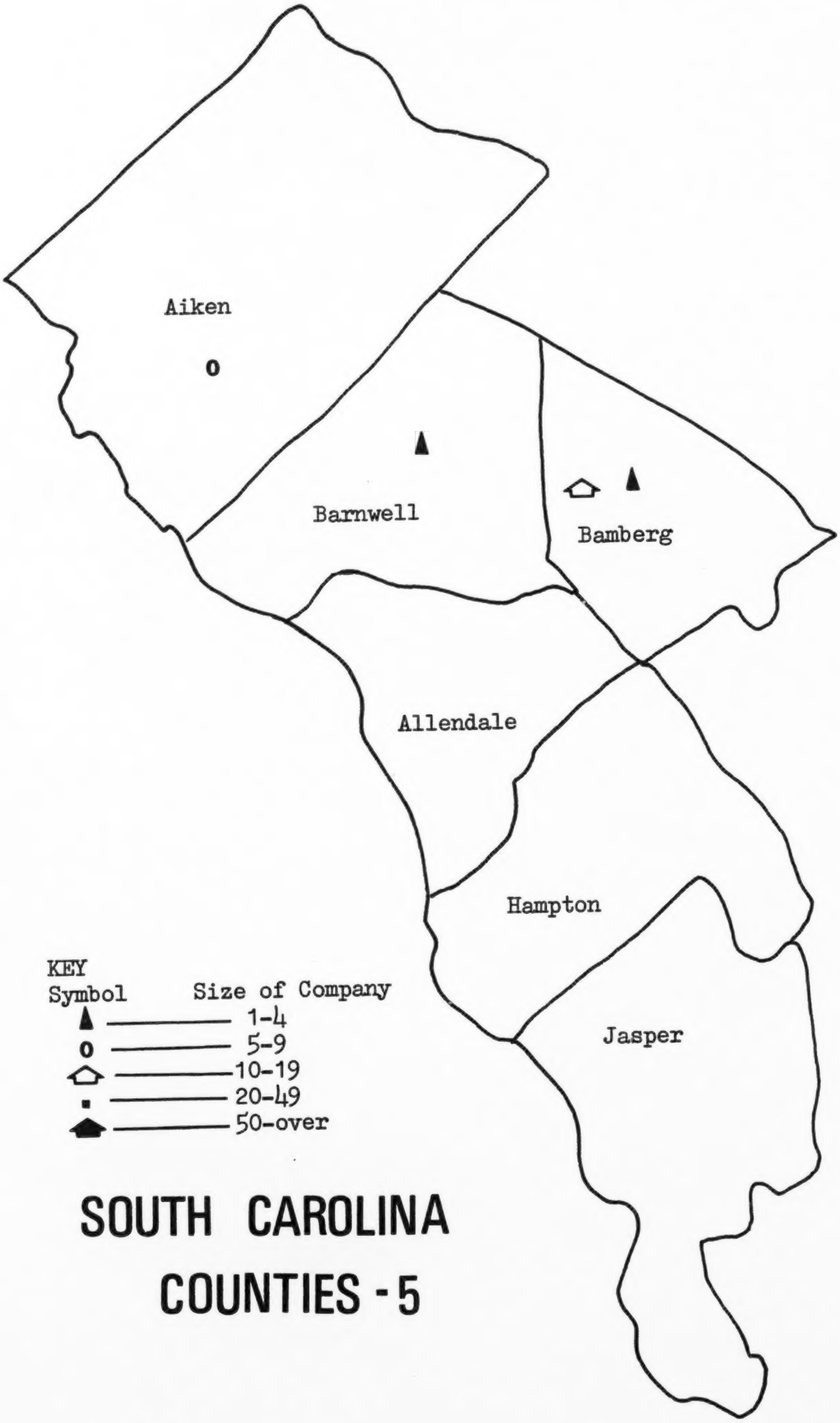
KEY

Symbol	Size of Company
▲	1-4
0	5-9
⌂	10-19
▪	20-49
⬟	50-over

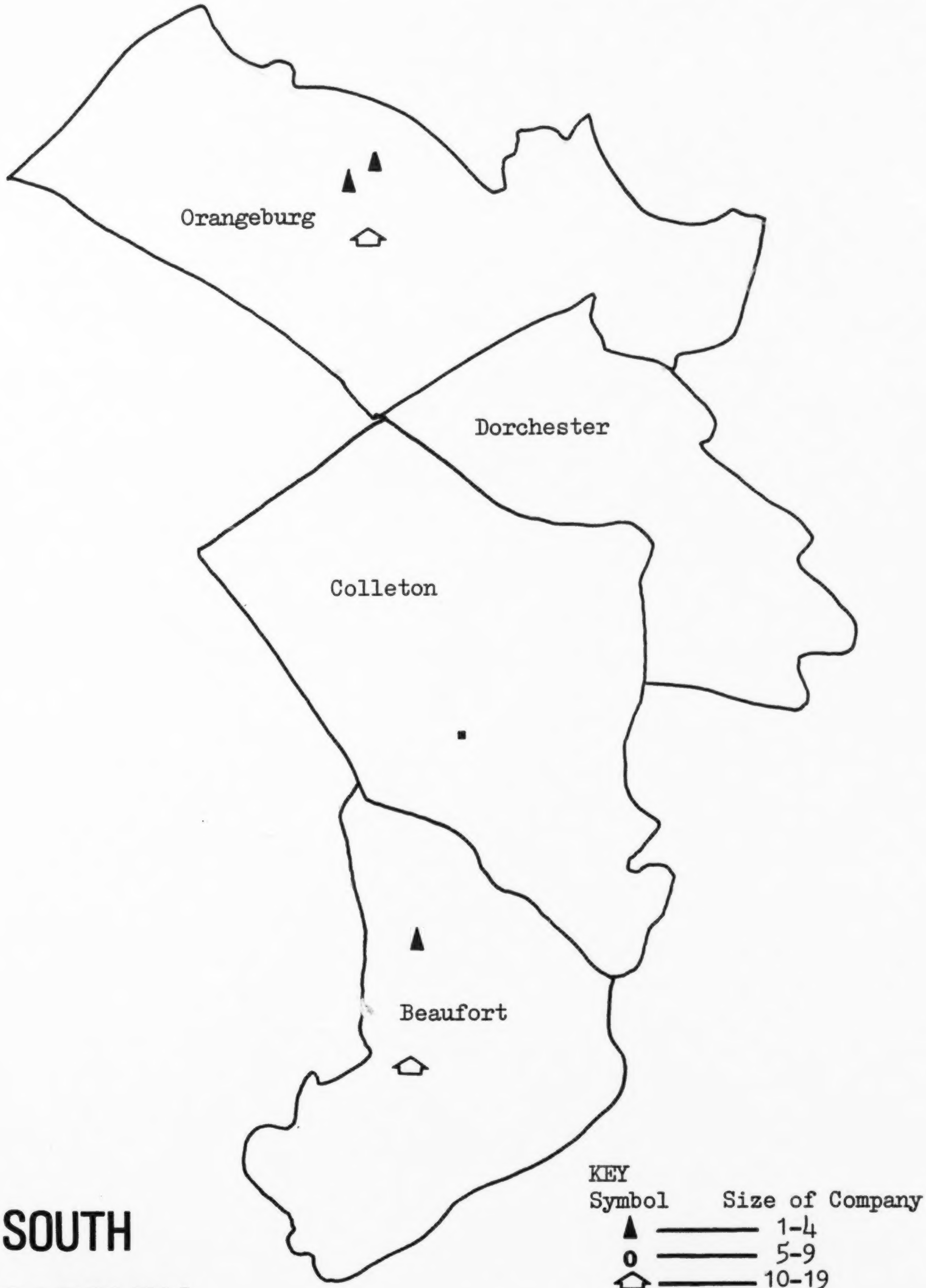


SOUTH CAROLINA COUNTIES - 4

Abbeville
Greenwood
Newberry
Saluda
McCormick
Edgefield
Lexington
*Richland
KEY
Symbol — Size of Company
▲ — 1-4
0 — 5-9
⌂ — 10-19
▪ — 20-49
⌂ — 50-over
* Each symbol represents three companies.

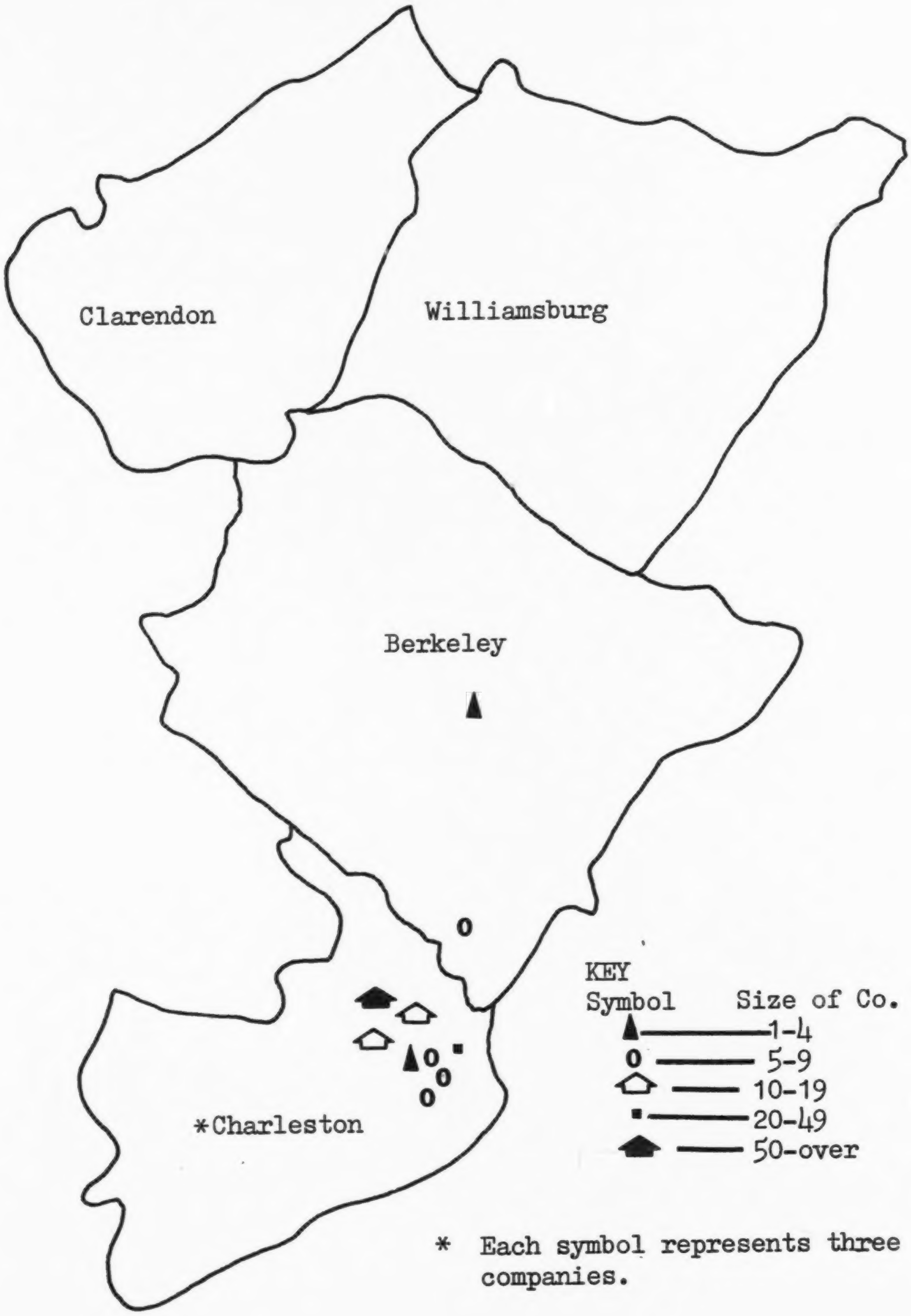

Aiken
o
▲
Barnwell
⌂ ▲
Bamberg
Allendale
Hampton
Jasper
KEY
Symbol Size of Company
▲ 1-4
o 5-9
⌂ 10-19
▪ 20-49
☗ 50-over

SOUTH CAROLINA
COUNTIES - 5

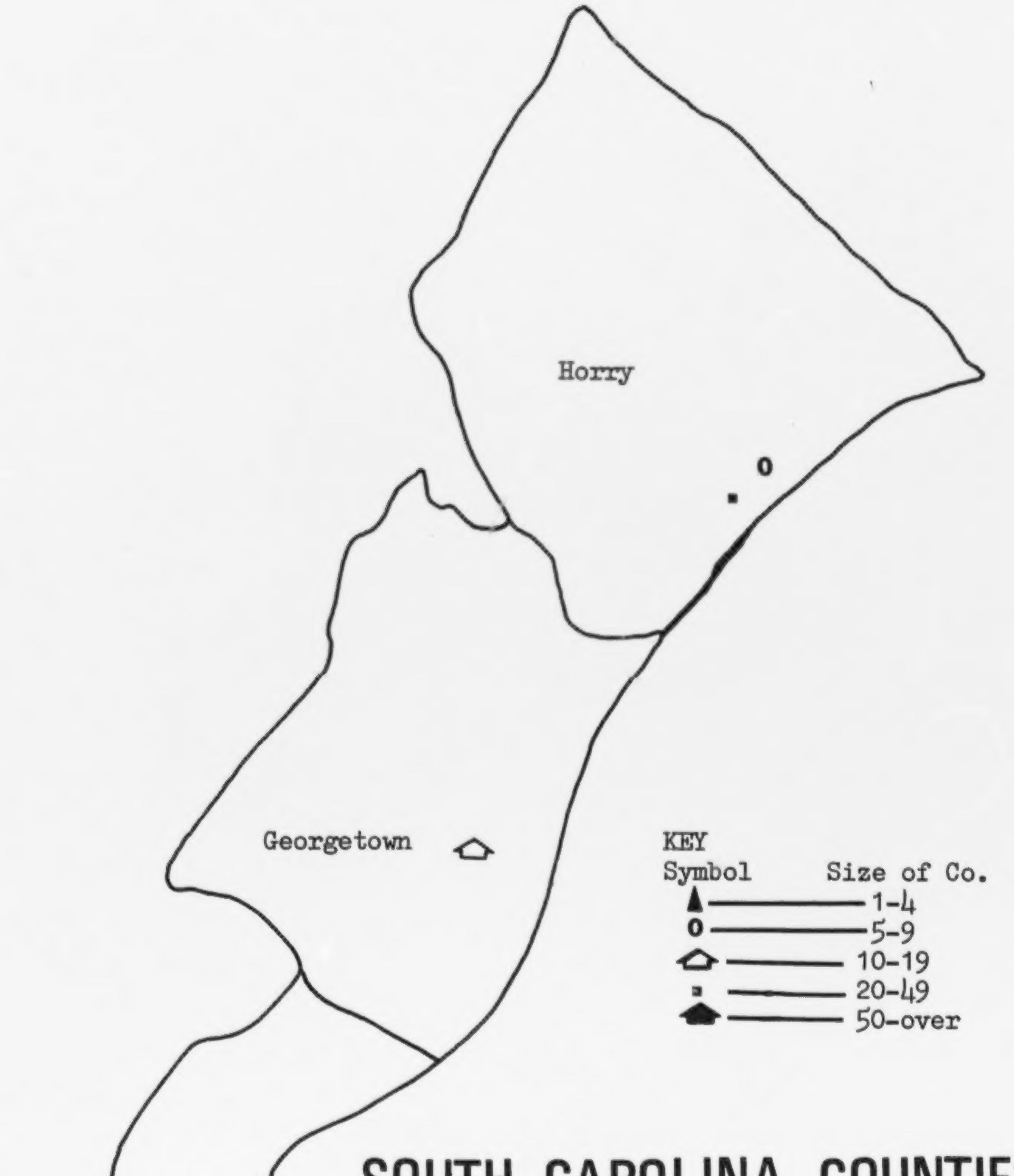

Orangeburg
Dorchester
Colleton
Beaufort
KEY
Symbol
Size of Company
▲ 1-4
o 5-9
⌂ 10-19
▪ 20-49
⬟ 50-over

SOUTH CAROLINA COUNTIES-6

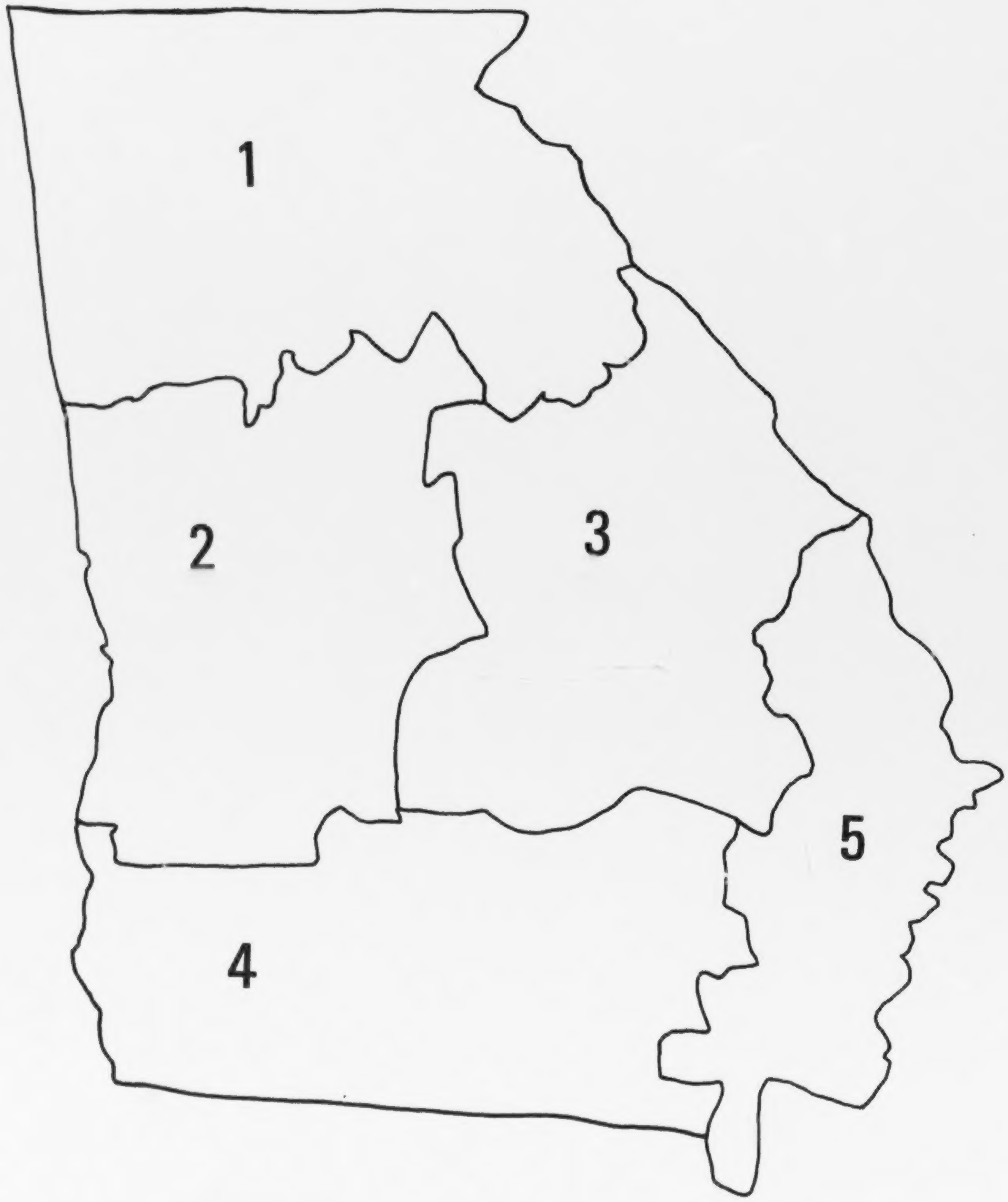
SOUTH CAROLINA COUNTIES - 7


Clarendon
Williamsburg
Berkeley
*Charleston
KEY
Symbol
Size of Co.
▲ 1-4
o 5-9
⌂ 10-19
▪ 20-49
☗ 50-over

* Each symbol represents three companies.

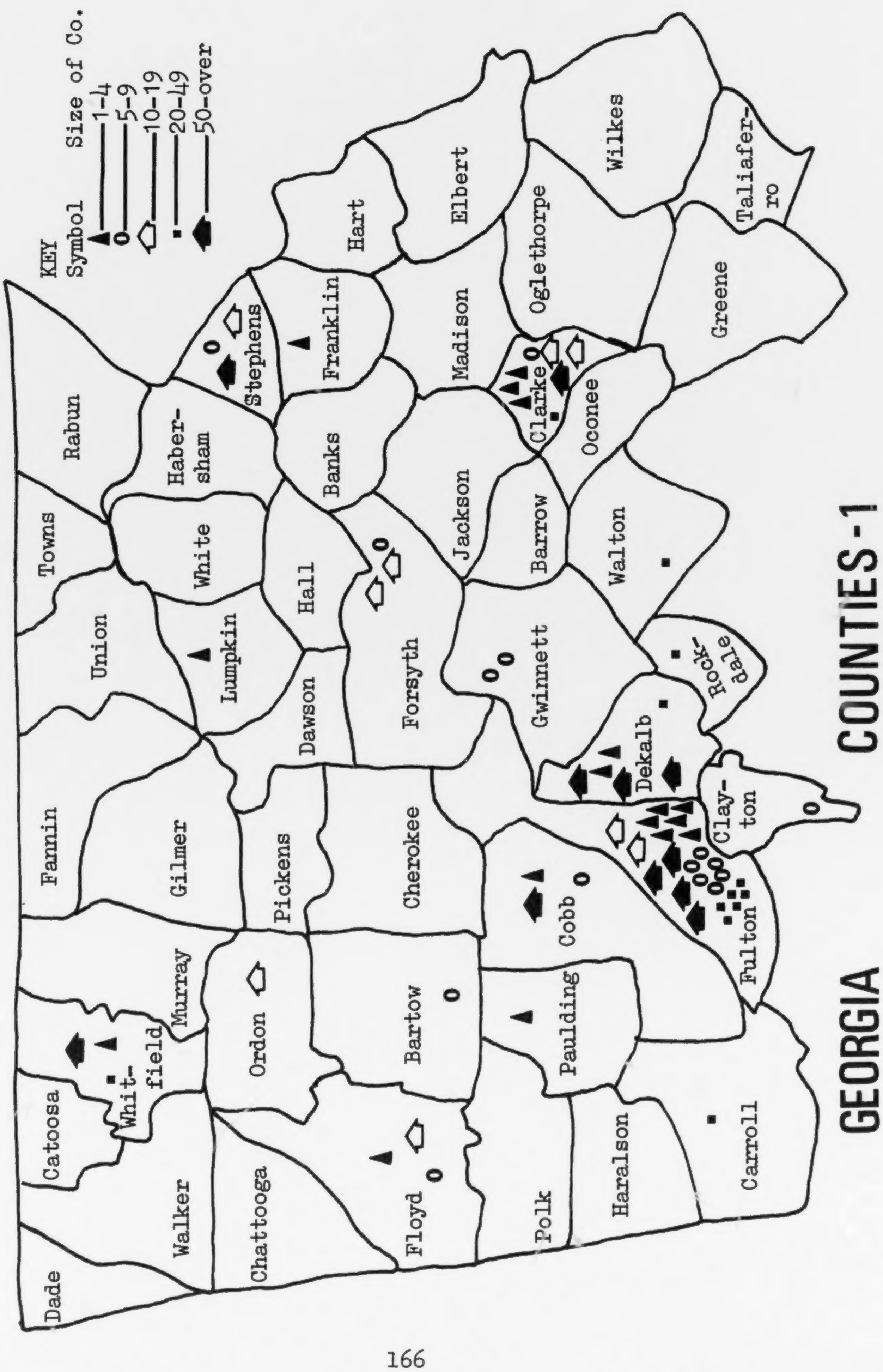

Horry
Georgetown
KEY
Symbol
Size of Co.
1-4
5-9
10-19
20-49
50-over

SOUTH CAROLINA COUNTIES-8

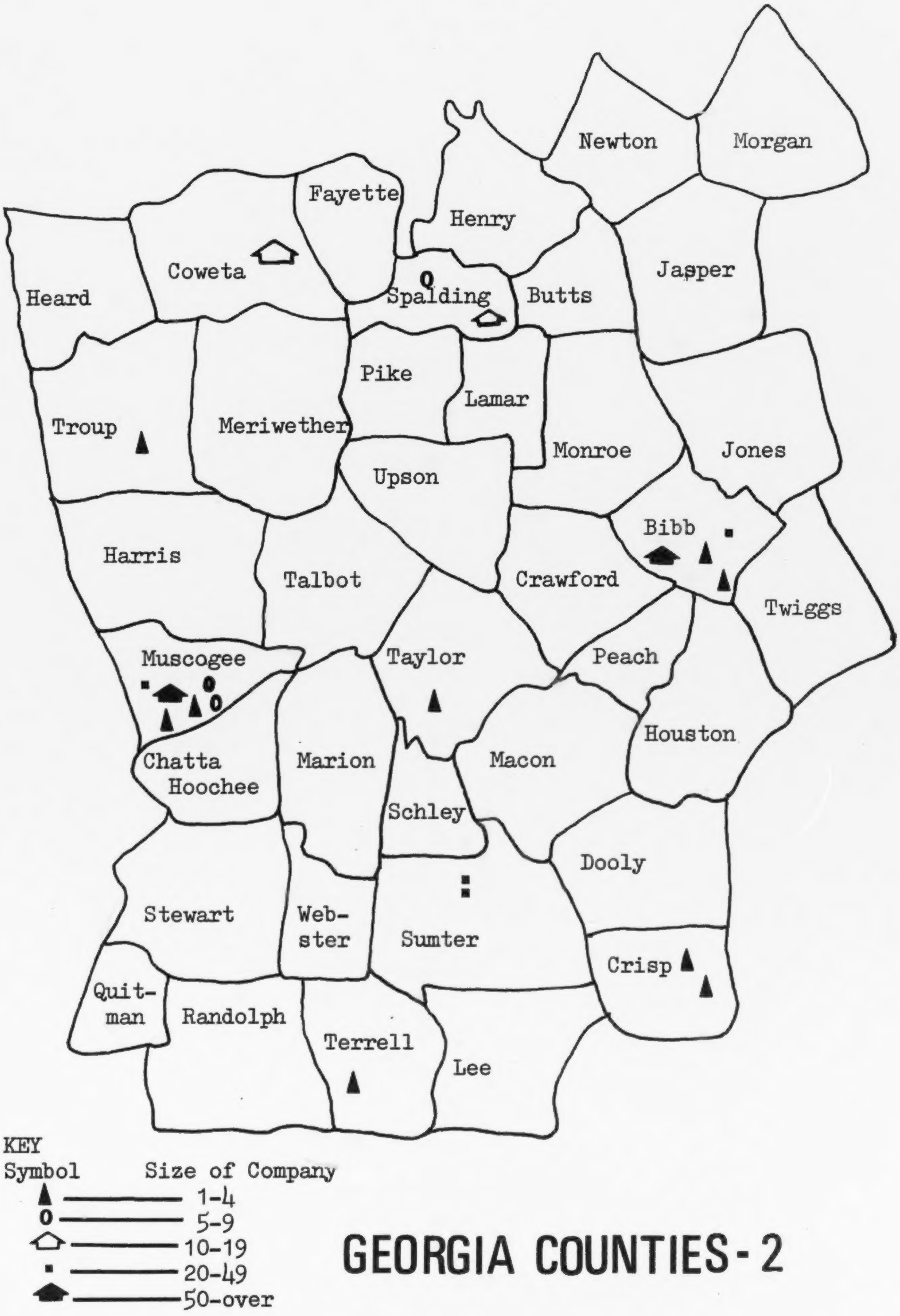


GEORGIA

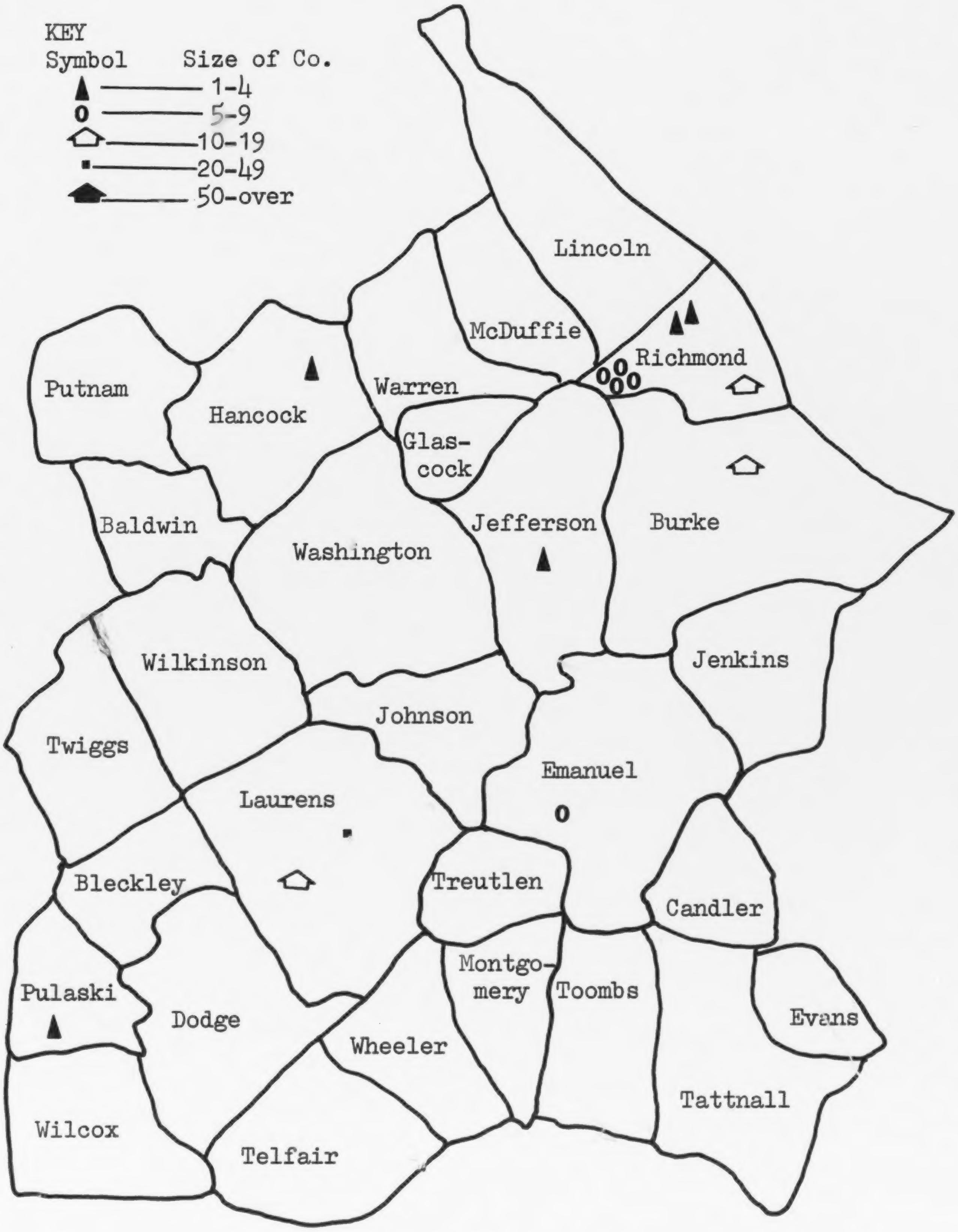
Numbers represent the area covered on each county map.


KEY
Symbol Size of Co.
▲ 1-4
0 5-9
⬠ 10-19
▪ 20-49
⬟ 50-over
Dade
Walker
Catoosa
Whit-field
Murray
Fannin
Union
Towns
Rabun
Chattooga
Floyd
Ordon
Gilmer
Pickens
Lumpkin
White
Haber-sham
Stephens
Franklin
Hart
Elbert
Wilkes
Taliafer-ro
Bartow
Cherokee
Dawson
Hall
Banks
Madison
Oglethorpe
Greene
Polk
Paulding
Cobb
Forsyth
Jackson
Clarke
Oconee
Haralson
Carroll
Fulton
Dekalb
Gwinnett
Barrow
Walton
Rock-dale
Clay-ton

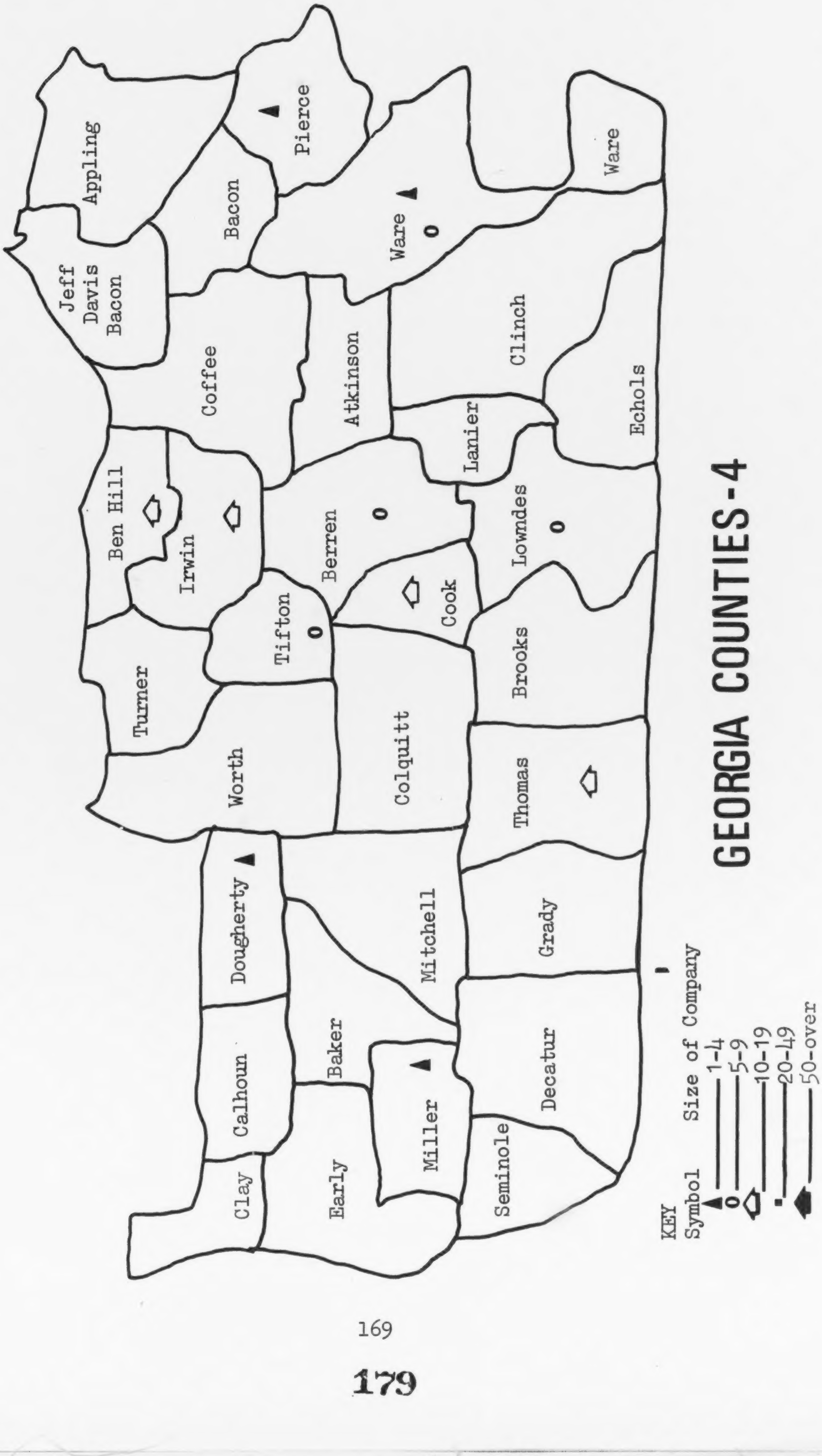
GEORGIA COUNTIES-1


Newton
Morgan
Fayette
Henry
Coweta
Heard
Spalding
Butts
Jasper
Pike
Lamar
Troup
Meriwether
Monroe
Jones
Upson
Bibb
Harris
Talbot
Crawford
Twiggs
Muscogee
Taylor
Peach
Houston
Chatta Hoochee
Marion
Macon
Schley
Dooly
Stewart
Web-ster
Sumter
Crisp
Quit-man
Randolph
Terrell
Lee
KEY
Symbol Size of Company
▲ 1-4
0 5-9
⌂ 10-19
▪ 20-49
⌂ 50-over

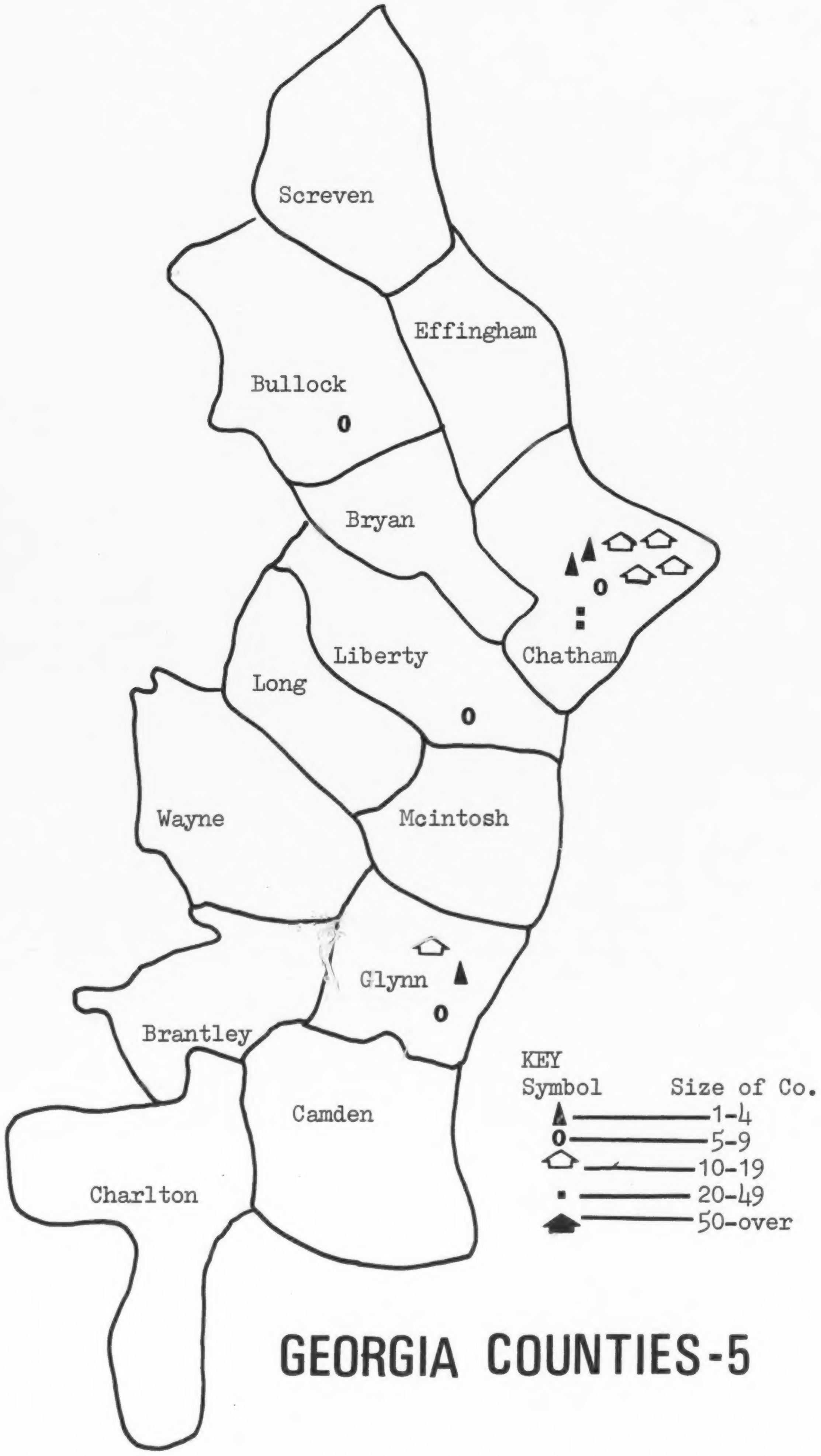
GEORGIA COUNTIES - 2


KEY
Symbol Size of Co.
▲ 1-4
0 5-9
⌂ 10-19
▪ 20-49
⬟ 50-over
Lincoln
McDuffie
Richmond
Putnam
Hancock
Warren
Glas-cock
Jefferson
Burke
Baldwin
Washington
Wilkinson
Jenkins
Johnson
Twiggs
Emanuel
Laurens
Bleckley
Treutlen
Candler
Montgo-mery
Toombs
Pulaski
Dodge
Evans
Wheeler
Tattnall
Wilcox
Telfair

GEORGIA COUNTIES -3


Appling
Pierce
Bacon
Ware
Ware
Jeff
Davis
Bacon
Coffee
Atkinson
Clinch
Echols
Lanier
Ben Hill
Irwin
Berren
Lowndes
Cook
Tifton
Turner
Brooks
Worth
Colquitt
Thomas
Dougherty
Mitchell
Grady
Calhoun
Baker
Decatur
Miller
Clay
Early
Seminole
KEY
Symbol
Size of Company
1-4
5-9
10-19
20-49
50-over

GEORGIA COUNTIES-4


Screven
Effingham
Bullock
Bryan
Chatham
Liberty
Long
Wayne
Mcintosh
Glynn
Brantley
Camden
Charlton
KEY
Symbol
Size of Co.
▲ 1-4
0 5-9
⌂ 10-19
▪ 20-49
▲ 50-over

GEORGIA COUNTIES-5